MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

TECHNO-ECONOMIC SURVEY OF ORISSA

Also by National Council of Applied Economic Research

Taxation and Foreign Investment
Prospects for a Mica Grinding Plant in India
Export Markets for Indian Lac
Criteria for Fixation of Water Rates and Selection of Irrigation Projects
Traffic Survey of the Port of Tuticorin
Demand Forecasts for Consumer Goods
Techno-Economic Survey of Bihar
Rehabilitation and Development of Basti District
Survey of Handloom Industry in Karnataka and Sholapur
The Managing Agency System
Domestic Fuels in India
Demand for Energy in India, 1960–75
Techno-Economic Survey of Madhya Pradesh
Ganga Traffic Survey
Delhi Saving Survey
Appraisal of Steel Demand
Replacement Cost in Industry
Employment Potential of Road Transport
Contribution of Road Transport to the Public Exchequer
Economic-Functional Classification of Central and State Government Budgets, 1957-58
Dieselisation and Diesel Oil Taxation
Traffic Survey of Mangalore and Malpe Ports
Techno-Economic Survey of Manipur
Techno-Economic Survey of Madras
Taxation and Private Investment
Saving in India—A Monograph
Economically Weak Tea Gardens in North-East India
Economic-Functional Classification of Government Accounts, 1951-52 and 1957-58
Some Aspects of Economic Growth of Under-developed Areas
Techno-Economic Survey of Tripura
Techno-Economic Survey of Himachal Pradesh
Urban Household Saving Survey Methods and Techniques
Techno-Economic Survey of Punjab

Occasional Papers

1. Foreign Exchange Crisis and the Plan
2. Some Aspects of Goods Transport in the Delhi Region
3. Utilization of Primary Energy in India
4. Commodity Disposition Survey in Delhi

Other Reports

Seminar on Demand Projections
Population Projections of India, 1951–76
A Study of Saving in India
Demand Projections for Foodgrains, Tobacco, Oilseeds and Cotton Textiles, 1960–75
Seminar on Techno-Economic Surveys
Supply of Entrepreneurs and Technologists

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

2A

TECHNO-ECONOMIC SURVEY OF ORISSA

NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH
NEW DELHI

AS 021105

© NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH

March 1962

– 5444
309.154409
Nat. T

330.95444
Nat — T

13 NOV 1962

CENTRAL SECRETARIAT LIBRARY
62-6378
13 SEP 1962
GOVT. OF INDIA

PRINTED IN INDIA
AT SREE SARASWATY PRESS, LTD., CALCUTTA AND PUBLISHED BY
NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH, NEW DELHI

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

Contents

Page

PREFACE xi

1. THE SETTING 1

2. AGRICULTURE 10

3. ANIMAL HUSBANDRY 28

4. FORESTS 34

5. FISHERIES 43

6. MINERALS 52

7. A PROGRAMME FOR LARGE SCALE INDUSTRY 73

8. LARGE SCALE INDUSTRIES WITH SCOPE FOR DEVELOPMENT 82

9. SMALL SCALE AND COTTAGE INDUSTRIES 98

10. POWER 106

11. TRANSPORT 118

12. MANPOWER 131

13. PUBLIC HEALTH 136

14. FINANCIAL RESOURCES 150

15. PATTERN OF GROWTH 165

16. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS 175

TABLES 193

APPENDICES 257

INDEX 305

GSL

List of Tables

Page

1. Area and Population Density in Orissa (1951) 195
2. Distribution of Population in Villages and Towns of different Sizes—All-India and Orissa (1951) 196
3. Urban Population as Percentage of Total Population by Districts (1951) 197
4. Proportion of Self-supporting Persons and Earning Dependents to Total Population in Orissa and other States (1957) 197
5. Number of Female Earners per 100 Male Earners in Orissa by Districts (1951) 198
6. Distribution of Earners by Industrial Status in All-India and Orissa (1951) 199
7. Sectoral Distribution of the Net Output in Orissa and All-India (1956-57) 199
8. State Income of Orissa for the Years 1950-51, 1956-57 and 1960-61 200
9. Estimates of Investment in Orissa during 1950-51 to 1956-57 and 1957-58 to 1960-61 201
10. Construction Expenditure in Orissa during 1950-51 to 1956-57 and 1957-58 to 1960-61 202
11. Average Yield per Acre of Major Crops in Orissa and All-India (Average 1955–58) 202
12. Area under Principal Crops and Their Contribution to Total Agricultural Output (1955-56) 203
13. Irrigation Potential in Orissa 203
14. Irrigation Schemes for Third and Fourth Plans 204
15. Proposed Targets and Outlay for the Agricultural Programme (1961–71) 205
16. Estimated Growth of Agricultural Production 206
17. Livestock in All-India and Orissa 206
18. Additional Employment Potential in Forest Development 207
19. Marine Fishing Villages, Crafts, Fishermen and Landings 207
20. Increase in Output and Investment in Fisheries between 1960-61 and 1965-66 208
21. Probable Changes in the Utilization Pattern of Fish Output (1961–71) 208
22. Minerals of Orissa: Deposits and Occurrences 209
23. Number of Mines in Orissa 214
24. Mineral Production in Orissa (1950–57) 215
25. Output of Minerals and Labour Productivity (1956) 216
26. Mineral Production in Orissa: Output and Value: Actuals for 1951 and 1957 and Estimates for 1961 and 1971 217
27. Relative Production of Iron Ores by Various States (1950–57) 218
28. Orissa's Share in All-India Mineral Production (1950–57) 218
29. Mineral Development in Orissa: Estimated Levels of Additional (Annual) Output, Employment and Investment (1961–71) 219
30. Factory Employment in Selected States of India 221
31. Distribution of Employment by Industries in Orissa and All-India (1957) 221
32. Distribution of Employment by Industries (1956-57 and 1960-61) 222
33. Estimated Investment, Output and Employment of the more Specific Industries Suggested (1970-71) 222
34. Additional Investment, Value of Net Output, Employment and Power Requirement for Categories of Specific Industries Suggested for the Third Plan 222
35. Additional Investment, Value of Net Output, Employment and Power Requirement for Categories of Industries Suggested for the Fourth Plan 223
36. Capacity, Investment, Value of Net Output, Employment and Power Requirement for Specific Industries Suggested for the Third Plan Period 223
37. Capacity, Investment, Value of Net Output, Employment and Power Requirement for Industries Suggested for the Fourth Plan Period 225
38. List of Metal-based Industrial Units Licensed (1951–59) 226
39. Positive and Probable Investment in Suggested (Large Scale) Industries (1961–71) 227
40. Investment in the Suggested Small Factory Plants by Location 227
41. Installed Capacity and Power Generation in Public Electric Utilities and in Industry-owned Plant (1959-60) 228
42. Installed Capacity of Public Electricity Undertakings (1950-60) 228

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

43. Electricity Generated (1950 to 1959–60) 229
44. Pattern of Power Generation (1955 to 1959-60) 229
45. Sale of Electricity from Public Utility Undertakings (1951 to 1959-60) 230
46. Pattern of Power Sales in Public Utility Undertakings (1951 to 1959-60) 230
47. Pattern of Power Sales in Public Utility Undertakings in India (1951 to 1959-60) 231
48. Per Capita Consumption of Electricity in Orissa and leading States of India 231
49. Pattern of Electricity Sales (Self-generation included) (1955 to 1959-60) 232
50. Industrial Power Consumption—Self-generation's share (All-India and Orissa) (1955 to 1959-60) 232
51. Hydro Electric Power Potential 233
52. Estimated Installed Capacity, Generation and Effective Consumption of Electricity (1960-61 to 1970-71) 233
53. Estimated Maximum Demand and Additions to Generating Capacity (1960-61 to 1970-71) 234
54. Investment for Power Development (1960-61 to 1970-71) 235
55. Road Development as envisaged in the Chief Engineer's Road Development Plan (1961–81) 236
56. Tentative Proposals of State Government for Road Development (1961–66) 236
57. Suggested Programme of Road Development (1961–66) 236
58. Estimate of Capital Expenditure on New (Railway) Lines and Open Line Facilities 237
59. Programme for Waterway Development (1961–66) 237
60. Suggested Investment in Improvement of Transport (1961–66) 238
61. Additional Manpower Requirement in Non-Agricultural Occupation (1961–71) 238
62. Proportion of the Total Working Force engaged in Different Sectors of the Economy in 1961 and 1971 239
63. Net Output per Worker by Different Sectors of the Economy in 1961 and 1971 239
64. Requirement and Supply of Technical Personnel 240
65. Requirement and Supply of Craftsmen 240
66. Output, Employment and Labour Productivity (1951, 1961 and 1971) 241
67. Estimated Vital Rates of Reorganized States for the period 1941-50 241
68. Death Rate by Causes (1951–57) 242
69. Cause Specific Death Rates: States and All-India (1957) 242
70. Death Rates from Chief Diseases by Districts (1952 and 1957) 243
71. Cause Specific Death Rates: Orissa and All-India (1952 and 1957) 243
72. Per Capita Monthly Consumer Expenditure in Rural Areas; States and All-India (1952) 244
73. Food Consumption Standards 244
74. Registered Doctors and Licentiates in All-India, Orissa and Selected States (1956) 245
75. Nurses, Midwives, etc., in Orissa and All-India (1956) 245
76. Provision for Medical and Health Programmes under the Second Five Year Plan 246
77. Additional Health Personnel Required by 1971 246
78. Estimated Allocation for Health Plan Schemes (1961–71) 247
79. Construction in Public Health Plan (1961–71) 248
80. Direct Employment Potential of Proposed Health Plan (1961–71) 248
81. Statement showing the Comparative Revenue Position of the State Governments (1957-58) 249
82. Statement showing Tax and Non-Tax Revenue of Orissa (1950-51 to 1959-60) 250
83. Functional Analysis of Expenditure by the Government of Orissa (1951-52 and 1957-58) 252
84. Proposed Investment by Centre and State Governments and the Private Sector (1961-71) 253
85. Allocation of Investment during 1951–61 and 1961–71 253
86. Projected State Income (1960-61 and 1970-71) 254
87. Phasing of Large Scale Industrial Development 255
88. Estimates of Employment and Labour Productivity (1961–71) 255
89. Shift in the Sectoral Distribution of Output and Employment (1961–71) 255

GSL

List of Appendices

	Page
1. Composition of the Survey Team	259
2. State Income of Orissa, 1956-57—Methodological Notes	260
3. Estimate of Investment in Orissa (1950-51 to 1956-57 and 1957-58 to 1960-61)	269
4. A Note on Agricultural Statistics in Orissa	275
5. A Note on the Programme for Extending Irrigation Facilities	276
6. List of Suggested Small Scale Industries for Orissa (1961–71)	283
7. Phasing of the Establishment of Suggested Small Industries in Orissa (1961–71)	286
8. Principal Rail Projects and Open Line Works in Orissa during Second Five Year Plan	289
9. Note on the Method of Estimating Requirement and Supply of Technical Personnel for the period 1961–71	291
10. Estimates of Outlays for Major Health Schemes during 1961–71	293
11. Methods and Basis of Projections of the State Governments' Receipts and Expenditure (on Revenue Account) in 1961–71	296
12. Proposed Investment by Centre, State and Private Sector in Orissa during 1961–71	299
13. State Income of Orissa, 1970-71—Methodological Notes	302

List of Maps

1. Administrative Divisions of Orissa	*Frontispiece*
2. Physiography of Orissa	*Frontispiece*
3. Orissa Natural Regions	5
4. Orissa Normal Annual Rainfall	6
5. Soils of Orissa	13
6. Hydrography of Orissa	14
7. Distribution of Minerals in Orissa	54
8. Regional Distribution of Industries in Orissa (1960)	76
9. Distribution of Agro and Textile Industries in Orissa (1957)	85
10. Distribution of Forest-based Industries in Orissa (1957)	86
11. Distribution of Mineral (Non-Metallic) and Metal-based Industries in Orissa (1957)	90
12. Major Industrial Development Possibilities in Orissa (1961–71)	96

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

	Page
13. Power Projects and Transmission Lines in Orissa	111
14. Railway Map of Orissa	119
15. Road Map of Orissa	120
16. Waterways in Orissa	123
17. Density of Traffic between Rourkela and its Raw Material Sources, 1956–66	124
18. National Highways in Orissa	127
19. Hinterlands of the Ports of Calcutta, Paradip, and Visakhapatnam	128
20. Distribution of Death Rates due to fevers (including Malaria) in Orissa (1957)	139
21. Distribution of Death Rates due to Dysentery and Diarrhoea in Orissa (1957)	140
22. Distribution of Death Rates due to Respiratory Diseases in Orissa (1957)	143
23. Distribution of Death Rates due to Small-pox in Orissa (1957)	144
24. Distribution of Death Rates due to Cholera in Orissa (1957)	147

List of Charts

1. Estimated Growth of Maximum Demand, Installed Capacity Needed and Actual Installed Capacity (1960-61—1972-73)	115
2. Percentage Distribution of Population by Age Groups in Orissa and All-India (1951)	137

CSL

Preface

EARLY IN 1959, the National Council of Applied Economic Research was invited by the Government of Orissa to undertake the Techno-Economic Survey of the State.

Broadly speaking, the objective of the survey was to make an appraisal of the various, currently available as well as potential, material resources of the State, and to assess the prospects of economic and industrial development of Orissa based on the above resources and other complimentary factors, such as transport, power, manpower, etc., necessary for effective utilization of the resources.

A field office was opened in Cuttack in January 1959 and the survey was formally inaugurated by the Chief Minister on February 22, 1959. For carrying out the survey a team was organized which consisted of economists, engineers, technical experts and foreign and Indian consultants. The composition of the survey team is given in Appendix 1. During the year 1959, several members of the team visited important centres of economic activity in Orissa and had extensive discussions with officials as well as non-officials to ascertain the major problems and potentialities of development in different fields. The field office in Cuttack was in constant touch with the various offices of the Government and other agencies for collecting the necessary data for the survey. The Preliminary Report was submitted to the State Government in June 1960 and it was finalized after considering the comments of the State Government.

The chapters which follow comprise the Economic Report. In addition, detailed Appraisal Reports on Forests, Fisheries, Minerals, Engineering and Metal-based Industries, Chemical Industries, Small Scale Industries and Agro-based Industries have been prepared and submitted to the Government. Appraisal Reports on Forests, Fisheries and Minerals give a more detailed appraisal of the technical aspect of each resource-field and indicate the broad lines of development of these natural resources themselves as well as of industries which could be based upon them. The time perspective in each case is generally 10 years ending by 1970-71. Appraisal Reports on various classes of industries examine the technical and economic feasibilities in respect of a number of individual industries mainly based on the natural resources available in the State and indicate their implications in terms of investment, power, output and employment. Separate Reports on Public Health and Tribal Areas were also prepared and submitted to the Government. Project profiles on selected small scale industries have been done separately. These will give sufficient technical and economic data to enable government and private entrepreneurs to take preliminary decisions on establishment of specific industries.

Orissa is an outstanding example of a State which despite rich endowment of natural resources has remained extremely backward. Its per capita income estimated at Rs. 190 in 1956-57 is very low compared to Rs. 294 for all-India. Agriculture which is the predominant sector of the State's economy has remained highly depressed. The prevailing techniques of cultivation yield a much smaller output than what is possible under the soil and climatic conditions of the State; highly inadequate transport and marketing facilities depress the prices which the farmer can get for his produce. Other natural resources, notably minerals and forests remained unexploited, largely because until very recently, there was no stimulus to growth, and partly also due to the absence of indigenous entrepreneurial classes. There were no doubt other factors retarding the development of the State. Notable among these is the fact that about a fifth of the people belong to primitive or near primitive tribes, for whom the change-over to a modern industrial society is even more difficult than for an average Indian. Until recently, power development was also meagre; and transport, technical training, education and other overhead facilities are highly inadequate even now. then

However, since the end of the First Plan some signs of a dramatic change are manifest in Orissa. Under the Second Five Year Plan considerable progress has been achieved in this State in the fields of irrigation, mineral and industrial development and among the economic overheads the power lacuna has been more or less made up. However, these are but the beginnings of a radical transformation of the State's economy in the years to come. Given the State's resources and taking the country's development requirements into account, one can confidently predict that the State economy can be made to grow at a rate fast enough for it to catch up with the rest of the country within the foreseeable future provided the State Government takes measures to strengthen its administration and to build up adequate economic and social overheads. In the field of agriculture the main emphasis will have to be on the improvement of rice yields by introducing modern techniques of cultivation through extension, and by improving the marketing organization through development of transport, credit and warehousing facilities. Similarly the infra-structure will have to be considerably strengthened by making adequate provision for power, transport, technical training and public health facilities, and also general education facilities.

Though agriculture accounts for nearly 70 per cent of the total working force in the State, agricultural productivity both in terms of value of output per engaged person and per acre of cultivated land is very low, despite the fact that nearly two-thirds of the cultivated land is under a high value crop like rice. Poor crop yields and low harvest price of rice are mainly responsible for this situation. Poor yields, in turn, are a reflection of backward techniques and low price of rice is a direct consequence of inadequacy of transport and lack of organized marketing facilities.

Till the beginning of the Second Five Year Plan, the industrial structure of Orissa was dominated by cottage and village industries. Even among the organized industries agro-based industries were predominant and there were hardly any mineral-based industries, despite a large potential of mineral resources. For instance, till the beginning of the Second Plan there was no steel plant in Orissa even though the iron ore deposits in the State were estimated at 8,000 million tons—the largest in all-India. Productivity per worker both in factory and non-factory industries in Orissa was lower than the average for many other States as well as for India as a whole.

Even today the infra-structure of the State's economy is by no means strong. Transport, technical training and public health facilities are even now highly inadequate. The interior of the State having large mineral resources is particularly isolated from other areas due to lack of transport development. The training facilities for technical jobs and other crafts are highly deficient. Inadequate public health facilities have kept the mass of people in

GSL

a state of poor health. These handicaps have adversely affected the overall productivity of the working men and women in the State.

In recent years, particularly during the Second Five Year Plan period, important steps have been taken to accelerate the pace of economic development in the State. The completion of Hirakud Multipurpose Project and the establishment of the Rourkela Steel Plant have been the significant landmarks in the planned development of Orissa. The former which has added to the irrigation and power potential of the State might become a strategic factor of growth; while the latter has resulted in a large expansion of the State's industrial output and also set the pace for further industrialization.

However, in spite of the backward economy of the State and the inadequate progress achieved in the recent past the pace of economic development in the coming years can be definitely accelerated. The State is rich in its natural resources. Its forests cover 42 per cent of the total area (as against 17 per cent in all-India) which could provide raw material for several industries. Its mineral resources comprising iron ore, coal, manganese, limestone, fire clay, bauxite and chromite are among the best in the country. The exploitation of these minerals and the establishment of several industries using them as raw materials will pave the way for rapid industrialization of the State. The rivers in Orissa provide ample scope for large scale development of irrigation and hydel power. The inland water resources and the long coastline could be harnessed for large scale fisheries development. In the field of agriculture, there is ample scope for increasing the farm output mainly by increasing the yield of rice and introducing double-cropping on a wide scale.

The National Council has examined the available potential for development in various fields. After making careful scrutiny of these resources and taking into consideration the developmental requirements in different fields for India as a whole, guidelines of development have been suggested for Orissa for the period 1961–71. These developments would require an investment of the order of Rs. 1,400 crores in the decade or Rs. 140 crores per annum.

Of the total investment, about 39 per cent will be in factory industries, 22 per cent in agriculture, 13 per cent in power, 4 per cent in mining and the balance in other fields. Investment in economic overheads such as power, transport, technical training, etc., has been particularly emphasized as the infra-structure of the State's economy needs considerable strengthening and without this it may not be possible effectively to absorb the large investments suggested in other fields.

The strong push to the growth of State's economy will come from the establishment of another steel plant at Bonaigarh and other metallurgical and metal-based industries. If this development takes place, then over the decade 1961–71 the industrial output in Orissa should increase eight-fold—the major contribution coming from mineral-based industries. The industrial structure should also undergo a healthy change as the productivity of the structure as a whole will be more than doubled, owing to preponderance of high-value adding heavy and metallurgical industries. Locationally the bulk of the industrial activity will be concentrated in the triangular area with Rourkela and Hirakud at the base and Cuttack at the apex.

The mining output is expected to grow at an annual rate of 37 per cent during the decade 1961–71 and this should lead to the establishment of several mineral-based industries within the State, as well as a large expansion of iron ore exports.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
GSL

In the field of agriculture, irrigation will be the most important development accounting for about 60 per cent of the investment in this sector. Other important measures include land development, particularly in the areas where shifting cultivation is prevalent, agricultural extension, propagation of better cultural practices and application of better seeds and fertilizers, throughout the State. As a result of these measures, during the current decade, the farm output should increase by more than 100 per cent. By 1971, this would allow a surplus of about two million tons of rice for export to other States as against the current level of about 300,000 tons.

Of the total investment suggested, about 77 per cent would be in the public sector, the share of the Central Government being nearly 48 per cent. The bulk of the Central Government investment would go in the iron and steel industry. Agriculture, power and transport development would be the main sectors for investment by the State Government. Nearly Rs. 110 crores, i.e., one-third of the total private investment amounting to Rs. 330 crores—would go to industry while the balance would be in agriculture and housing.

The impact of the suggested programme of development for Orissa on the manpower situation would be to cause a slight shortage in agriculture, mainly because a large number of agricultural workers would be absorbed in mining, industry and tertiary activities due to higher emoluments. This situation could be taken advantage of by introducing labour-saving techniques and organizational improvement in agriculture. One of the major recommendations for increasing the farm output made in this Report is to increase the area under double-cropping which will have a salutary effect of reducing seasonal unemployment in the rural sector. Both these measures would have the healthy effect of increasing the agricultural productivity to a considerable extent. In case labour-saving techniques in agriculture cannot be introduced extensively the shortage of manpower in Orissa will have to be met by encouraging immigration of labour from other over-populated States.

To meet the large demand of technicians and skilled industrial workers that will arise during the decade, the training facilities in the State will have to be considerably increased at all levels. Advantage could also be taken of employing technical personnel from other States.

As a result of the implementation of the programme as envisaged in this Report there will be rapid growth of the economy during the decade and the structure of the economy will be placed on a sound footing. The State income is expected to grow at the rate of 14 per cent per annum during the current decade. Per capita income will almost double and catch up with the all-India level of 1971. The share of agriculture in the State income will fall from 50 per cent to 30 per cent and that of factory industry would go up from 6 to 20 per cent.

If the recommendations of the Report could be implemented, then the overall productivity per worker will appreciably increase over the period 1961–71—the increase could be of the order of 250 per cent in factory industry and 50 per cent in other sectors.

The net result of all this development would be to transform the State from a backward agricultural economy into a progressive industrial State.

It may be stated that the developmental programme suggested in this Report is undoubtedly feasible, from technical as well as economic point of view. However, whether this order of development would materialize would depend upon the ability of the State Government to streamline its administration, to put into effect the changes of organizational nature recommended in this Report and to raise the required financial resources. Above all, it may

SL

be emphasized that the ultimate success of the programme will depend upon a radical change in the attitudes of the people towards modern techniques of production and other developmental measures which can be brought about only through education, training and demonstration. It is needless to say that basically this aspect of development should receive the highest attention of the State authorities.

During the course of the Survey, several members of the Council's staff visited the State and had the benefit of discussions with various Government officers and leaders of industry and trade. I take this opportunity to thank all of them for their help and cooperation. I am particularly thankful to Mr. A. G. Menon, the then Industry Secretary, who took keen interest in the Survey work and gave all the possible help that we wanted.

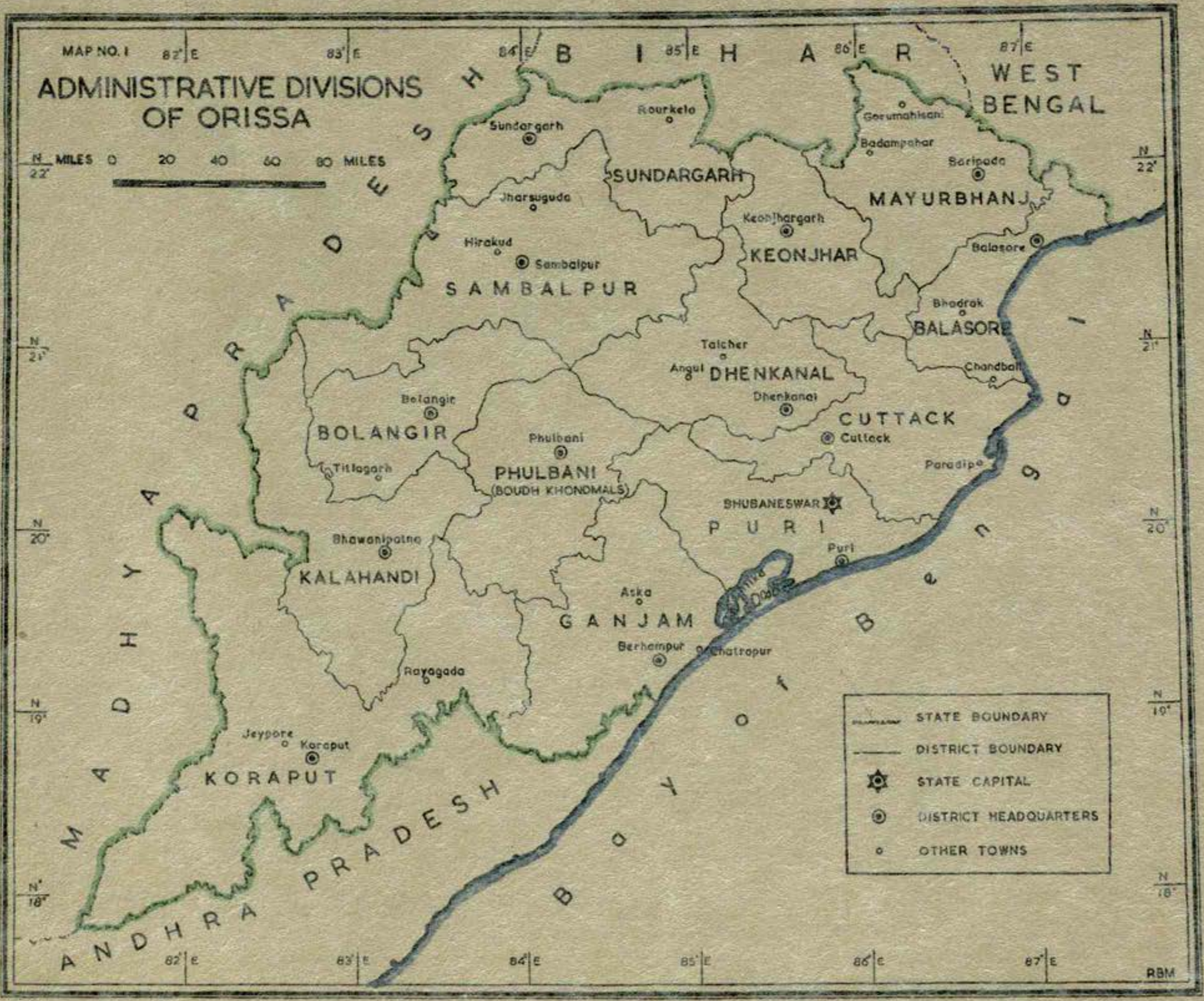
This Report is the result of the team work of the Council's staff who not only took keen interest in the work but also enjoyed participating in it. Without the keen and enthusiastic cooperation of all my colleagues, Indian and foreign, this Report could not have been written and I want particularly to acknowledge the help of Mr. M. V. Divatia, Director of the National Council.

NEW DELHI
November 1961

P. S. LOKANATHAN
Director-General

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

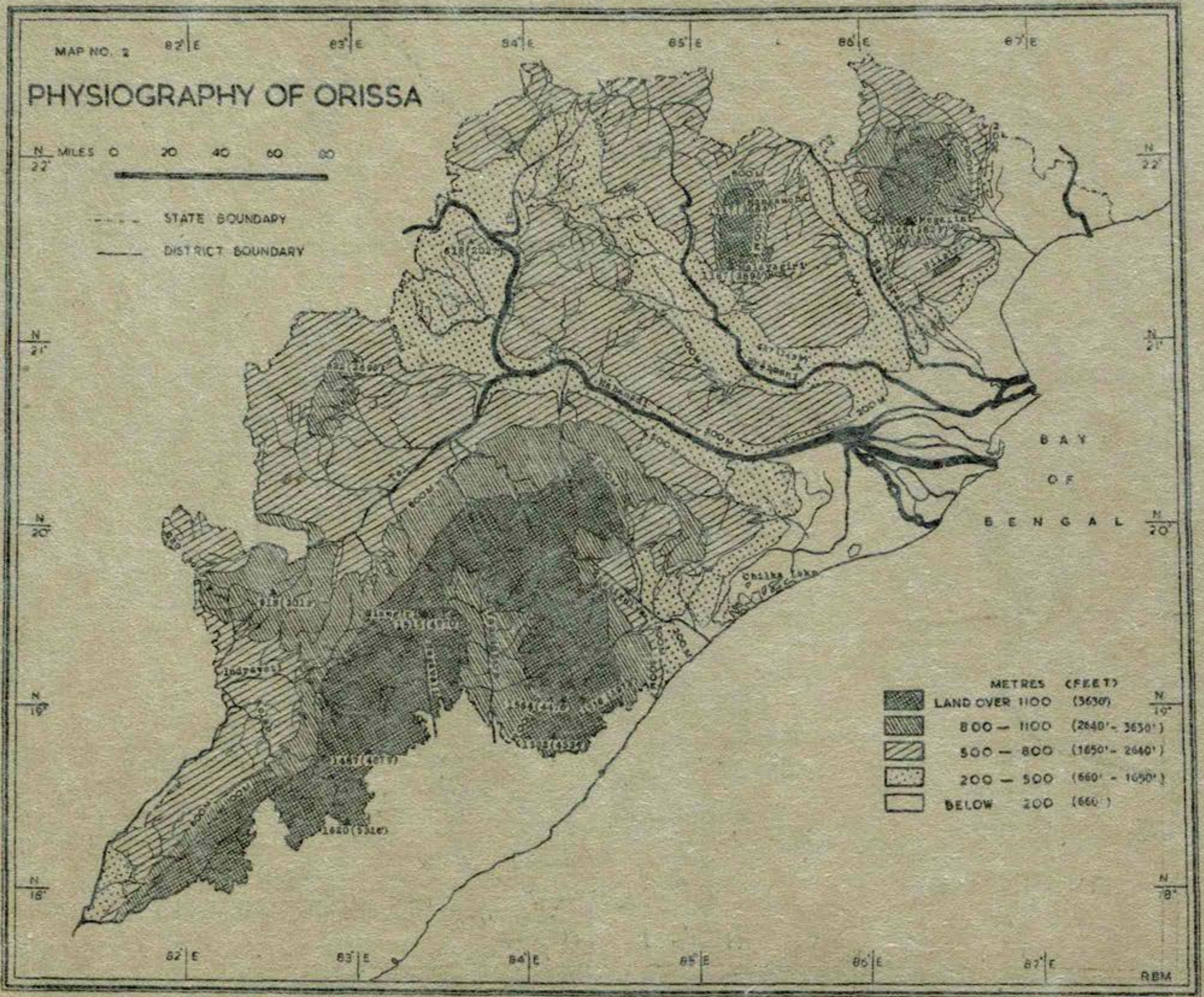


MAP NO. I

ADMINISTRATIVE DIVISIONS OF ORISSA

MAP NO. 2

PHYSIOGRAPHY OF ORISSA



MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

Chapter I

The Setting

PHYSICAL FEATURES

THE STATE OF Orissa is situated in the north-eastern section of the Indian peninsula and extends over an area of 60,000 sq. miles. It is a maritime State with a coastline of 250 miles, along the Bay of Bengal. It has a common boundary with West Bengal in the north-east, Bihar in the north, Madhya Pradesh in the west and Andhra pradesh in the south. (Map 1)

1.2 Orissa is an extensive plateau which slopes gently into the coastal plain along the Bay of Bengal (Map 2). The Mahanadi, flowing west to east through the plateau, cuts it into two defined parts. The northern part is an extension of the Chotanagpur plateau and the southern part is covered by hill ranges known as the Eastern Ghats. Towards the west and south-west of the State, there are thus four well-defined physical regions of the State: the northern plateau, eastern ghats, the coastal plain and the erosional plains and river basins of the central tableland. (Map 3)

The Northern Plateau

1.3 The two rivers Brahmani and Baitarani flowing through the northern plateau dissect it into three blocks. The eastern block consists of the heavily forested hills of Mayurbhanj district and the peneplain which slopes from these hills to the Bay of Bengal. The middle block is again a well forested hilly region which occupies most of Keonjhar district and parts of Dhenkanal and Sundargarh districts. The eastern block of the plateau is flat topped and steep edged with dense forest over parts of it. Most of the region receives 64 to 72 inches of rainfall. (Map 4)

1.4 The northern plateau is richly endowed with minerals. The Dharwar rocks of Mayurbhanj, Keonjhar and Sundargarh are the source of iron ore and manganese deposits and the Gondawana rocks of Talcher have large deposits of coal. Other minerals which occur in this plateau are limestone, chromite and dolomite.

The Eastern Ghats

1.5 The Eastern Ghats rise abruptly and steeply in the east and slope gently to a dissected plateau in the west. This plateau has some open valleys which are highly fertile. The annual rainfall in a major part of this region ranges between 50 and 60 inches. The rocks of Eastern Ghats have, so far, proved of little economic value although some manganese and graphite deposits are reported to exist. The principal wealth of this region is in its forests.

1.6 The Mahanadi–Tel basin, covering two-thirds of Sambalpur and Bolangir districts and one-third of Kalahandi district is the more important of the two erosional plains of Orissa. The other is in Koraput district in the south-west of the State. In addition to these, there are three important river valleys—the Baitarani, the Brahmani and the Mahanadi—all located in the central and western parts of the northern plateau. The erosional plains and river valleys constitute the more fertile tracts of the interior of the State.

Coastal Plain

1.7 The coastal plain stretching over the districts of Balasore, Cuttack, Puri and a part of Ganjam is fertile and well-suited for intensive cultivation. The heart of the region is the large delta formed by the joint action of the Mahanadi, the Brahmani and the Baitarani. The plain which is the most densely populated area of the State also produces the major portion of its agricultural output.

POPULATION

1.8 According to the 1951 Census, Orissa had a population of 14·6 million. There were fewer people per square mile (244) in Orissa than in India as a whole (312). However, the density of population varied from region to region within the State (Table 1). The coastal plain was the most densely populated while the hilly areas of Koraput, Sambalpur, Phulbani, Keonjhar and Sundargarh had a relatively low density.

1.9 The provisional figures of 1961 Census show that the population of Orissa has gone up to 17·57 million and the density per square mile to 292. For the State as a whole the rate of increase in the total population during the decade 1951–61 was 1·99 per cent per annum. Sundargarh with 3·75 per cent showed the highest increase due to the establishment of Rourkela Steel Plant, raising its density to 202. Koraput, Sambalpur, Sundargarh, Dhenkanal and Keonjhar districts have densities which are lower than the density for the State as a whole. Districts with higher densities are Balasore, Cuttack, Puri, Ganjam, Bolangir and Mayurbhanj.

Composition of Population

1.10 In its composition, the population of Orissa is somewhat different from most other States in India. It has a relatively large component of persons belonging to the Scheduled Tribes. Of the 14·6 million people who lived in the State in 1951, 2·97 million or about 20 per cent belonged to these tribes. The tribal people are quite different from the rest of the State's population, and for centuries they have lived in the forests of the Eastern Ghats and the northern plateau and have been isolated from the main stream of the State's social and economic life. They are economically backward and depend for their livelihood mainly on forests and shifting cultivation or a primitive form of settled agriculture. They have very little industrial activity even on a cottage scale. The strong attachment they have for their own culture and traditions has made them less responsive to the change that has been taking place around them. On the other hand, the attitude of the rest of the population in general has tended to discourage them from leaving the security associated with their own traditional ways. Introducing these people to means by which they can improve their standard of living is a difficult and delicate task which must be undertaken with great care but as early as possible.

1.11 At the time of the 1951 Census, 96 per cent of the population of Orissa lived in rural areas. By comparison, the proportion of rural population in India as a whole was much less (83%). The villages in Orissa were relatively small and scattered. The average size of population of a village in Orissa was 290 while in all-India it was 528. The small urban population of the State was distributed in 39 towns of which only two had a population of more than 50,000. About 75 per cent of the towns were really large villages. (Tables 2 and 3)

Population Growth

1.12 The population in Orissa increased at the average rate of 0·85 per cent per year during the decade 1941–51. This was a substantially lower rate of growth than the one recorded for India as a whole (1·3% per year). Vital statistics reveal that while the birth rates in Orissa and India were roughly the same (41), death rate in the former was much higher (33 as compared to 28 in all-India). There has been considerable improvement in Orissa in mortality rates during recent years, but relative to all-India rate the position remains the same. Poor diet, high incidence of both endemic and epidemic diseases, and inadequate health facilities are mainly responsible for the high death rate in Orissa.

1.13 In Orissa measures to eradicate malaria and the provision of public health services appear to have caused a marked decrease in the death rate during the last decade. But no sharp decline seems to have occurred in the birth rate. This has resulted in a high rate of population growth in Orissa during 1951–61, and it seems likely that the population of Orissa would continue to grow at least at this rate in the decade 1961–71. The Census of 1961 places the population of Orissa at 17·57 million, showing a rise of 19·94 per cent over 1951 or 1·99 per cent per annum. At this rate the population of the State in 1971 will be 21·35 million.[1]

Working Force

1.14 According to the 1951 Census, the working force[2] in Orissa constituted 38·6 per cent of the population (Table 4). In this respect, the State was not very different from India as a whole where 40 per cent of the population constituted the working force. The proportion of persons belonging to the working age group (15 to 64) in Orissa was also more or less the same as in all-India (about 58%). There were no significant regional variations in the manpower situation, except that female participation in the coastal area was generally lower than in the interior (Table 5). In its occupational pattern also, Orissa was similar to India as a whole (Table 6). Nearly 70 per cent of the working force was engaged in agriculture while about one-tenth was employed in mining and manufacturing and the remaining in tertiary activities. Mining and manufacturing accounted for a larger proportion of working force in all-India while in Orissa tertiary activity engaged a larger proportion of working force.

1.15 In a backward agricultural economy, unemployment problem manifests itself through under-employment. It is difficult to estimate its extent but on general considerations, it appears that Orissa does not suffer from this problem to any greater extent than the country as a whole. In terms of labour productivity, however, the average Orissa labourer does not compare favourably with his counterpart in many other parts of the country. Generally he is physically weak because of the poor diet that he normally consumes and the enervating diseases, such as malaria

---

[1] NCAER Population Projections (Provisional).

[2] Comprising the census categories of self-supporting persons and earning dependents.

GSL

and stomach ailments to which he is constantly exposed. On account of the poorly developed organized industry in the State and insufficient technical training facilities, opportunities to learn industrial skills have been limited. As a result, fairly large proportion of the skilled labour employed in Orissa does not lack the capacity to acquire skill if opportunity for learning is available. A large number of skilled and semi-skilled workers employed in Calcutta and other nearby industrial centres are migrants from Orissa.

STRUCTURE OF THE ECONOMY

1.16 Structurally, primary activities are more important in the economy of Orissa than in that of all-India. The contribution of agriculture and mining to net output is higher in Orissa than in the country as a whole. Manufacturing industry is correspondingly less important while tertiary activities contribute roughly the same proportion in the State as in the country. (Table 7)

1.17 The preponderance of agriculture and inadequate development of industry in the State is symptomatic of its economic backwardness. In fact the State is among the poorest and least developed regions of the country. Its per capita income in 1956-57 was Rs. 190 as compared with Rs. 266 in the country as a whole. The consumer expenditure levels as indicated by the Fourth Round of the National Sample Survey were consistently lower in Orissa than in all-India for most items of consumption.

Agriculture

1.18 The area of cultivated land available per head (1·21 acres) of agricultural population in Orissa is larger than in all-India (1·18 acres). But agricultural productivity is lower. An acre of cultivated land produced on an average a net output of Rs. 109 in 1956-57 as compared to Rs. 134 in India as a whole. The net output per worker in agriculture was also lower—Rs. 300 in the State as compared to Rs. 500 in all-India.

1.19 The low productivity of land in Orissa is surprising since it has a large area under rice,[1] normally a high value crop. The relatively lower crop yields and low agricultural prices account for the low productivity. The average yield of rice per acre in Orissa (776 lbs.) is less than in other rice growing States, e.g., Madras (1216 lbs.), Andhra Pradesh (1055 lbs.), and West Bengal (900 lbs.). The average harvest price of rice in 1955-56 was only Rs. 12.79 per maund in Orissa as compared to Rs. 17 to 18 in Madras and Rs. 15 to 16 in Bihar and West Bengal. Other crops are relatively less important in the State. The yields of most of these crops are also lower than the average for the country.

1.20 Backward techniques of cultivation are largely responsible for low yields. Although the proportion of cultivated area under irrigation in Orissa is the same as in all-India, the use of fertilizers, manures and improved seeds is much less, land utilization is not so intensive and cultural practices are poor. The reasons for the low price of rice are more complex. But basically the inadequacy of transport and organized marketing facilities result in post-harvest gluts which depress the prices.

---

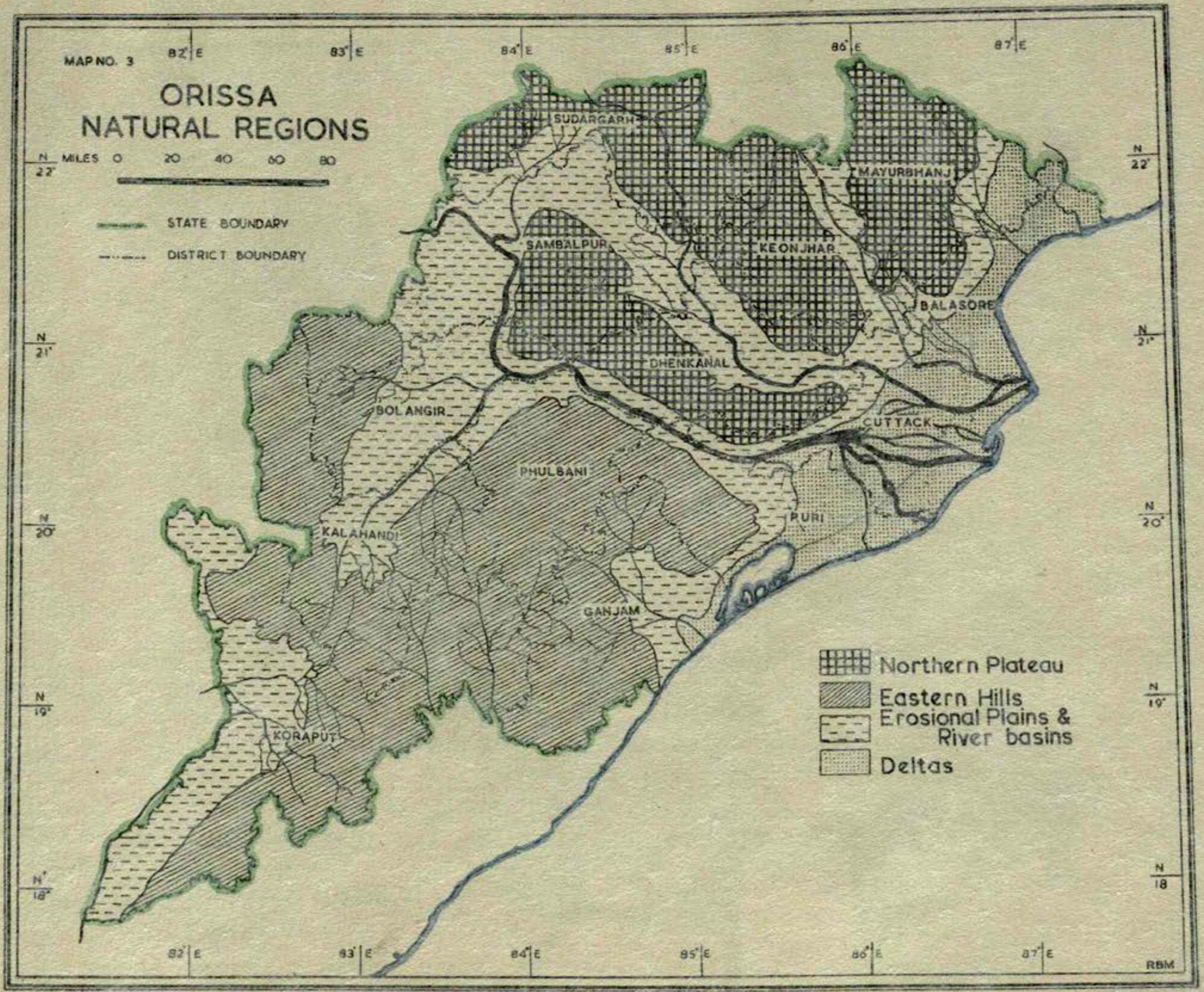
[1] 62 per cent of its total cropped area was under rice in 1956-57.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

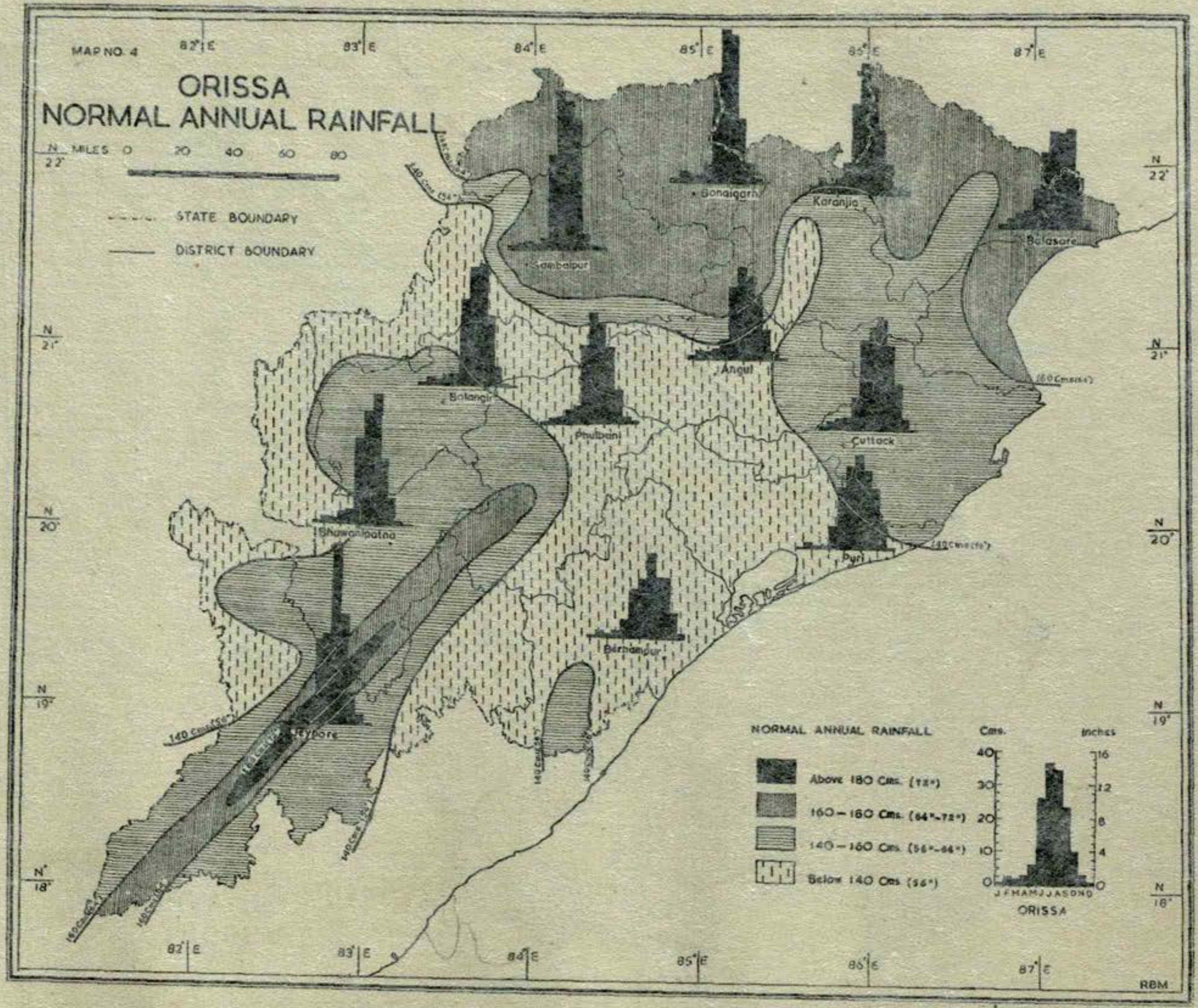
CSL

MAP NO. 3

ORISSA NATURAL REGIONS



▦	Northern Plateau
▨	Eastern Hills
☐	Erosional Plains & River basins
░	Deltas


MAP NO. 4
ORISSA
NORMAL ANNUAL RAINFALL
MILES 0 20 40 60 80
STATE BOUNDARY
DISTRICT BOUNDARY
82° E
83° E
84° E
85° E
86° E
87° E
N 22°
N 21°
N 20°
N 19°
N 18°
Sambalpur
Bonaigarh
Karanjia
Balasore
Bolangir
Angul
Phulbani
Cuttack
Bhawanipatna
Puri
Berhampur
Jeypore
140 Cms (56")
160 Cms (64")
180 Cms (72")
NORMAL ANNUAL RAINFALL
Above 180 Cms. (72")
160 – 180 Cms. (64"–72")
140 – 160 Cms. (56"–64")
Below 140 Cms (56")
Cms.
Inches
40
30
20
10
0
16
12
8
4
0
J F M A M J J A S O N D
ORISSA
RBM

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

Industry

1.21 The industrial sector in the State is relatively small and dominated by the unorganized cottage type of industries. In 1956-57, for every factory worker, there were 14 workers in these industries. In all-India the ratio was 1 : 3·8. This is a significant index of industrial backwardness because the predominance of the cottage sector implies poor technological development and a low labour productivity in industry. The situation in Orissa is made worse by the fact that labour productivity in both the non-factory and factory sectors is 30 per cent lower (Rs. 494 and Rs. 1,500 respectively) than the average for the country as a whole (Rs. 790 and Rs. 2,100).

1.22 Generally, basic and heavy industries (e.g., metallurgical, metal-based and heavy chemical industries) add more value per worker than other industries. Till recently these industries were relatively less important in the industrial structure of Orissa. However, this is not the only reason for low labour productivity in the factory industry of the State. Inadequate transport, inefficient techniques and organization, and lack of public health facilities are other important factors which adversely affect industrial productivity.

Transport

1.23 Inadequacy of transport facilities can be judged from the fact that while for all-India there are 226 miles of roads per 1,000 sq. miles, Orissa has only 195 miles. The quality of roads in Orissa is also poor and many of them do not have proper bridges and culverts. Furthermore, there are several regions which are not accessible by roads. The ratio of railway bridges to the geographical area of the State is also low and is in fact the lowest among all the States except Assam.

1.24 The above outline of Orissa's economy may seem depressing, but even a brief consideration of its abundant natural resources would leave no doubt regarding the vast scope of development that lies ahead of it. In fact, the State has already made a promising beginning in this direction.

Natural Resources

1.25 The most important of Orissa's natural resources is its mineral wealth. It has one of the best reserves of good quality iron ores in the country within a relatively short distance of the Jharia coal fields. The coal reserves of the State are substantial; in addition, Orissa has also large reserves of manganese ore, chromite, limestone and fireclay.

1.26 Forests which cover 42 per cent of the State's geographical area and constitute 8 per cent of the country's forest area are another rich source of industrial raw material. They have a large timber potential as well as abundant growth of bamboos—the most important raw material for the paper industry.

1.27 The coastal and erosional plains and river valleys of Orissa have fertile soils and offer much scope for agricultural development. The numerous rivers flowing through these plains have a large irrigation potential which, if exploited, would facilitate more intensive cultivation of land to produce larger quantities of food as well as of commercial crops.

1.28 The fish resources of the State—marine as well as inland—are only partly exploited.

CSL

Deep sea fishing which is negligible and inland fish culture in which a beginning has been only recently made, can be expanded manifold to provide the base for a large fishing industry.

TREND OF GROWTH, 1951-61

1.29 The two significant steps that have been taken in recent years towards the exploitation of the State's resources are the construction of the Hirakud Dam and the setting up of the Rourkela Steel Plant. Both these developments mark a turning point in the growth of industry in Orissa. The structure of industries has also changed to a superior type. This is evident from the fact that during the First and Second Plan periods several important industries were established in Orissa, e.g., aluminium, ferro-manganese, ferro-chrome, steel pipes and tubes, fertilizers, sulphuric acid, refractory, glass, paper, pig iron and several engineering industries.

1.30 On the basis of these, it is expected that while the importance of agriculture-based industries in the State would decline, the importance of mineral- and metal-based industries would increase greatly and the contribution of factory industry to the State's net product would rise from 1·6 per cent in 1956-57 to 5·9 per cent in 1960-61. (Table 8)

1.31 But, however important this change might be in respect of the possibilities it holds for the future, it will not be able to make a marked impression on the level of per capita income in the State unless it is accompanied by a substantial rise in the productivity of the agricultural sector. It is in this field that the progress made so far has not been significant. During 1951–61, net output of agriculture increased only by about 18 per cent or at the rate of about 1·8 per cent per year. (Table 8)

1.32 The per capita income in Orissa in 1951 was Rs. 190 as compared to Rs. 294 in India as a whole. In 1961 the per capita income in Orissa and India are expected to be Rs. 212 and Rs. 312 respectively. The average rate of growth was about one per cent per annum in Orissa as against 2 per cent in all-India. This slow rate of growth in Orissa in spite of a 600 per cent increase in industrial output, 100 per cent increase in mining and 369 per cent increase in construction clearly brings into relief the necessity of accelerating the rate of agricultural development. This must be particularly emphasized since the rate of growth in Orissa has to be higher than the average for India as a whole if the State is not to remain among the more backward ones in the country.

1.33 The expected increase between 1951–61 of Rs. 86 crores in the State's net output would result from an investment of about Rs. 434·9 crores (Table 9). The capital-output ratio would thus be 5·1: 1. This relatively high ratio was mainly the result of the pattern of investment during the Second Plan in which a large investment in the Rourkela Steel Plant has been made. On account of the relatively long gestation period of a steel plant, production by the end of the Second Plan period is expected to be only a quarter of the installed capacity. A high capital-output ratio in the industries sector is inevitable in Orissa so long as the stress remains on the development of basic industry. The ratio can be expected to taper off eventually as the industrial pattern gets more diversified.

1.34 The capital-output ratio for agricultural sector during the period 1951–61 was 3·6 : 1. It is possible to have a lower ratio by ensuring fuller utilization of irrigation and other facilities and by bringing about organizational improvements in the development programme for agriculture.

Ministry of Culture · Government of India

GSL

The Strategy of Growth for Orissa

1.35 The strategy of growth for Orissa that emerges from the above discussion is to encourage the trend of growth already started in the industrial sector and to lay special emphasis on the acceleration of the growth rate in agriculture. This would require considerable strengthening of the infra-structure of the economy which should be undertaken as an essential part of the strategy of growth.

Development of the Infra-Structure

1.36 The existing inadequacy of transport facilities would become more acute as the centre of industrial activity shifts from the coastal plains to the northern plateau, with the development of mineral-based and other industries. This will necessitate not only an increase in the existing transport facilities but also their dispersal towards the interior of the State. In addition to this, development of transport facilities in the rural areas is essential to widen markets for the surplus farm produce which would in turn provide the farmers with an incentive to raise agricultural production through improved techniques. There are several forest pockets in the State which at present are unexploited because of the absence of roads. To develop the forest potential of the State these roads would have to be constructed.

1.37 The State is fortunate in having a large hydro as well as thermal power potential. Currently the potential of hydro power is estimated to be about 2900 MW. In addition, the large proved reserves of coal in Talcher area are both suitable and adequate for generating considerable thermal power.

1.38 The present facilities for technical training are wholly inadequate and would require immediate sizable expansion to meet the requirements of the industries which are expected to grow rapidly. Technically trained personnel would also be required to man development programmes in other sectors.

1.39 New townships have normally to be built or existing towns expanded where large industries are located. Unless town planning is undertaken in anticipation of industrial developments, many unforeseen problems and bottlenecks are likely to arise. Special emphasis in this connection must be placed on protected water supply and a modern sewage system to ensure a minimum of municipal amenities.

1.40 For rapid rate of economic growth, a healthy working force is an essential pre-requisite. To this end, concerted effort is required to improve health standards of the people of Orissa.

1.41 Any substantial increase in the growth of agricultural production in a backward region requires an efficient extension service to educate the farmers in better techniques of cultivation. Without this even large investments may not result in any significant increase in agricultural output.

1.42 Finally, the success of development programmes, however well conceived, depends in a large measure on the quality of the State administration. The importance of strengthening the administrative system, and orienting it more purposefully to the tasks of planning cannot be over-emphasized.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

Chapter 2

Agriculture

AGRICULTURE is the most important economic activity in Orissa whether judged by the volume of employment or by the value of output. Its predominance in the economy of the State is even more marked than in the country as a whole. In 1956-57, nearly 47·7 per cent of the total income of Orissa was derived from agriculture as against 43 per cent in all-India.[1] About 70 per cent of the working population of the State was engaged in agriculture. The predominance of agriculture can also be inferred from the unusually high proportion of the population of the State that lives in villages. In 1951, the rural population constituted nearly 96 per cent of the total population of Orissa as compared to 83 per cent in all-India.

LOW PRODUCTIVITY

2.2 The productivity of agriculture in Orissa, by whichever criterion it is measured, is lower than that in the country as a whole. In 1956-57, the net value of agricultural production was Rs. 147·6 crores on a total cropped area of 15 million acres giving an average output of Rs. 98 per acre while the all-India average was Rs. 134 per acre. The output per engaged person in agriculture came to Rs. 120 in Orissa[2] as compared to Rs. 180 in all-India.

Causes

2.3 Generally, inferior cropping pattern, poor yields and low agricultural prices are responsible for low productivity in agriculture. In Orissa, the crop pattern by itself is, however, a relatively less important explanation of the low per acre value of agricultural production. Although the proportion of area under commercial crops is low, nearly 62 per cent of the total cropped area is under rice which is generally considered to be a high value crop. However, rice yields much less in value in Orissa than in most of the other rice growing States. This is partly due to the low average yield. In 1959, average yield of rice per acre was estimated at 776 lbs.[3] per acre which, though comparing favourably with the all-India average of 754 lbs. was less than the average yield in Madras (1216 lbs.), Andhra Pradesh (1055 lbs.), Kerala (1015 lbs.) and West Bengal (900 lbs.).[4] The per acre yields of other crops also are low in comparison with the all-India average, with the exception of pulses and sugarcane. (Table 11)

2.4 The other reasons for low productivity of rice cultivation are the low proportion of double cropped area and the comparatively low harvest prices of rice that prevail in the State.

---

[1] Based on C.S.O. Estimates of National Income.

[2] Statistical information regarding area and yield of crops in Orissa for previous years is extremely inadequate. The limitations of agriculture statistics in Orissa are discussed in Appendix 4.

[3] According to the Crop Cutting Surveys conducted in 1959-60 (*vide* Table 11).

[4] The average for 4 years (1954-55 to 1957-58) as given in the *Abstract of Agricultural Statistics*, Ministry of Food and Agriculture, Government of India.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

Only 8 per cent of the total cultivated area is double cropped as against 14 per cent in all-India. The average harvest price of rice in 1955-56 was only about Rs. 13 per maund in Orissa, as compared to Rs. 17 to 18 per maund in Madras and Andhra Pradesh and Rs. 15 to 16 per maund in Bihar and West Bengal.[1]

2.5 Considering these facts, it is not surprising that Orissa is one of the poorest States of India. The per capita income of the State in 1956-57 was Rs. 190,[2] as compared to the all-India figure of Rs. 283.[3] The per capita annual consumption of rural population in 1952 was Rs. 183 in Orissa while it was Rs. 261 in all-India.[4] The pattern of consumption expenditure also confirms the relative poverty of the people of the State. Generally poverty goes with a high proportion of expenditure on food consumption. The National Sample Survey data indicate that the percentage of the total expenditure spent on food was higher in Orissa (71%) than the all-India proportion of 66 per cent.

2.6 The poverty of the people of Orissa can be traced largely to the low productivity of the agricultural sector. No attempt to raise the standard of living of the people can succeed unless the productivity of this sector is raised appreciably. The fact that agriculture absorbs more than three-fourths of the working force and contributes the major portion of total output makes improvement in agricultural productivity a necessary condition for any significant increase in per capita income. This implies the adoption of manures to bring about higher yields per acre and better prices for agricultural products.

2.7 In Orissa, a large expansion in agricultural—chiefly foodgrains—production is necessary for many reasons. With the growth of population, the food requirements of the State will expand. The population of the State recorded an increase of 21 per cent in the last decade and there are reasons to believe that it would grow more or less at the same rate in the present decade also. It is obvious that a step-up of foodgrains production of at least the same order is required even to maintain the consumption and exportable surplus at the existing levels. The development of industry will lead to greater demand for agricultural products. In view of the great natural advantages that Orissa possesses for agricultural production and the need for national self-sufficiency in foodgrains, it will have to step up its food production substantially.

2.8 Such an increase in agricultural production can be brought about by raising agricultural productivity, which is essentially a matter of obtaining higher per acre yields. The scope for changing the crop pattern is somewhat limited in Orissa on account of climatic and soil considerations.

CLIMATE

2.9 The climate of Orissa is characterized by high temperature and medium-to-high rainfall. The minimum annual temperature is 91°F, rising to 101°F in April and May and falling to 95°F in July and about 80°F in January. The mean rainfall of the State is 59 inches varying from 55 to 63 inches in different regions. About 81 per cent of the rainfall is received during the period June-September mainly from the Bay of Bengal branch of the southwest monsoons.

---

[1] *Agricultural Prices in India*, Ministry of Food and Agriculture, Government of India.

[2] NCAER Estimates of State Income.

[3] C.S.O. Estimates of National Income.

[4] *Report of the National Sample Survey*, Fourth Round (April—September 1952).

The variability of rainfall from normal is relatively high, but since the annual precipitation is fairly high, floods are a bigger menace than drought. Such climatic conditions are essentially suitable for growing such crops as rice, sugarcane and jute, with the extension of irrigation facilities and increase in double-cropped area the production of pulses, oilseeds also can be stepped up.

TOPOGRAPHY AND SOIL

2.10 Orissa can be divided into four natural regions, viz., the coastal plain, the central tableland, the northern plateau and the eastern ghats. Not all these are equally endowed with potentialities for agricultural development.

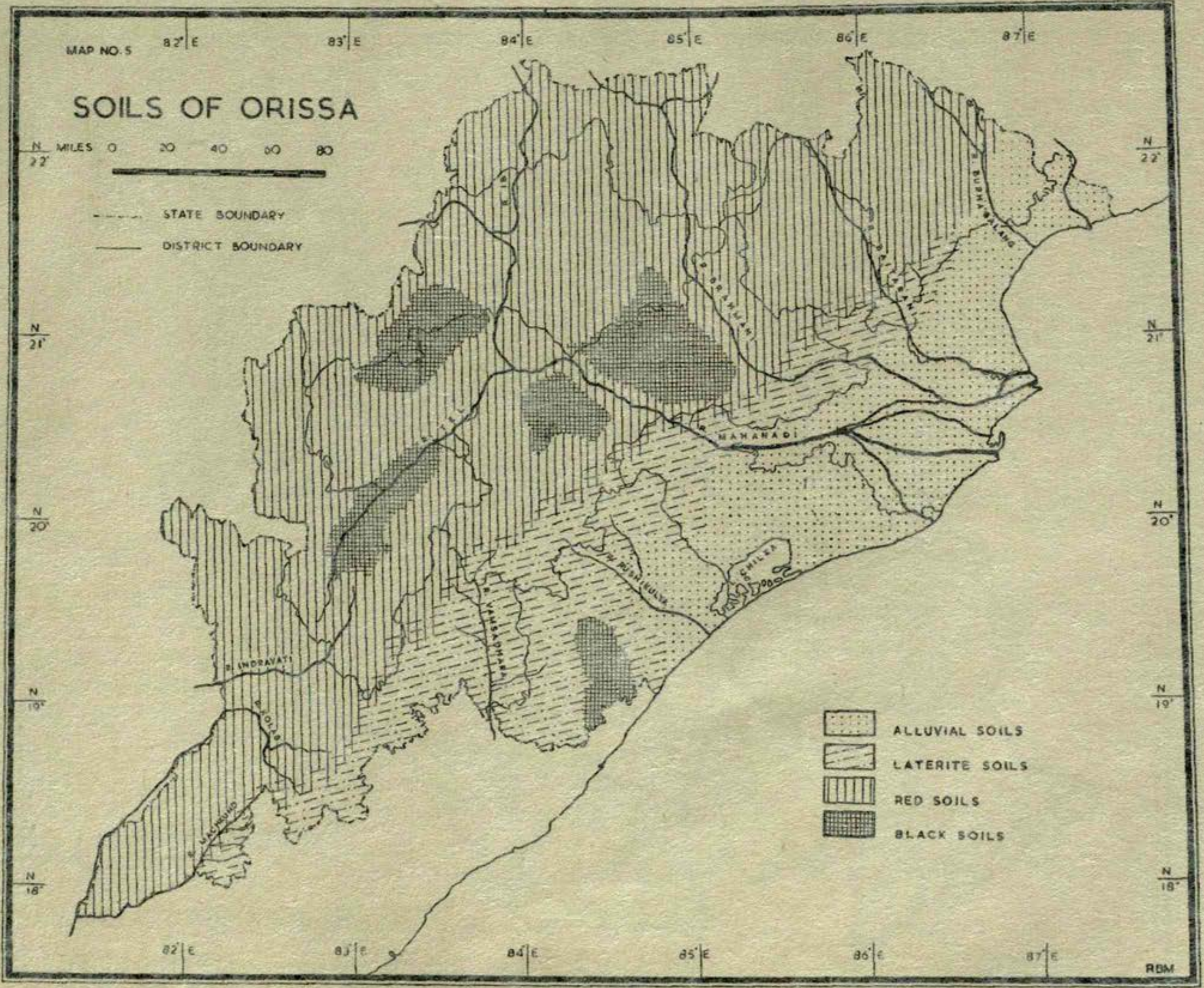
2.11 The coastal plain which covers about 9,000 sq. miles in the districts of Puri, Cuttack, Balasore and Ganjam is densely populated and intensively cultivated. The most important part of this region is the delta formed by the Mahanadi, the Brahmani and the Baitarani rivers. The alluvial soils of this region are agriculturally the most important in the State (See Map 5). The nature of the alluvium varies from district to district, the soils of Cuttack being clay and clayey loams as compared to the sands and sandy loams found in Balasore, Puri and Ganjam. The soil, in general, is deficient in phosphoric acid and has a low nitrogen content, but has sufficient potash. The yields can be increased if nitrogen and phosphorus deficiency is removed by the use of fertilizers.

2.12 The central tableland covers about 28 per cent of the area of the State and includes a number of erosional plains and river basins in the districts of Bolangir, Sambalpur and Dhenkanal. The most important of these is the Mahanadi–Tel basin covering two-thirds of Sambalpur and Bolangir and one-third of Kalahandi. This region has also the three river valleys of the Baitarani, the Brahmani and the Mahanadi, all of which are suitable for agriculture. It contains a peneplain in the district of Koraput, drained by the Indravati river system (Map 6). The Mahanadi–Tel basin and the other river valleys have a red soil that is poor in nitrogen, phosphoric acid, humus and lime, but produces good crops in area which are not shallow. It responds well to irrigation giving yields which are second only to that of the alluvial soils of the coastal plain. Black soil is found scattered in Dhenkanal, Phulbani, Kalahandi and Bolangir. It is rich in potassium and magnesium and poor in nitrogen and phosphorus. It is suitable for growing rabi crops like pulses and wheat.

2.13 The northern plateau covers the districts of Mayurbhanj, Keonjhar, Sundargarh and the Palehara subdivision of Dhenkanal. Much of the plateau is hilly, heavily forested, and not suitable for agriculture. The eastern part, however, has a peneplaned surface intersected by the Bushabalang and Salandi rivers. This upland plain lying mainly in Mayurbhanj is suitable for irrigation. Two-thirds of the northern plateau is covered by a red soil similar to that found in the central tableland. The eastern part has agricultural potentialities if irrigation facilities are made available.

2.14 The Eastern Ghats region covers the districts of Koraput, Kalahandi and part of Ganjam. The hills slope gently to the west into a plateau dissected by river valleys which are agriculturally important. This region has laterite soils formed by the decomposition of rocks. As a rule these soils are poor in plant nutrients, chiefly phosphate and potash, though they are fairly rich in nitrogen. Their fertility can be increased by deep ploughing and addition of manure.

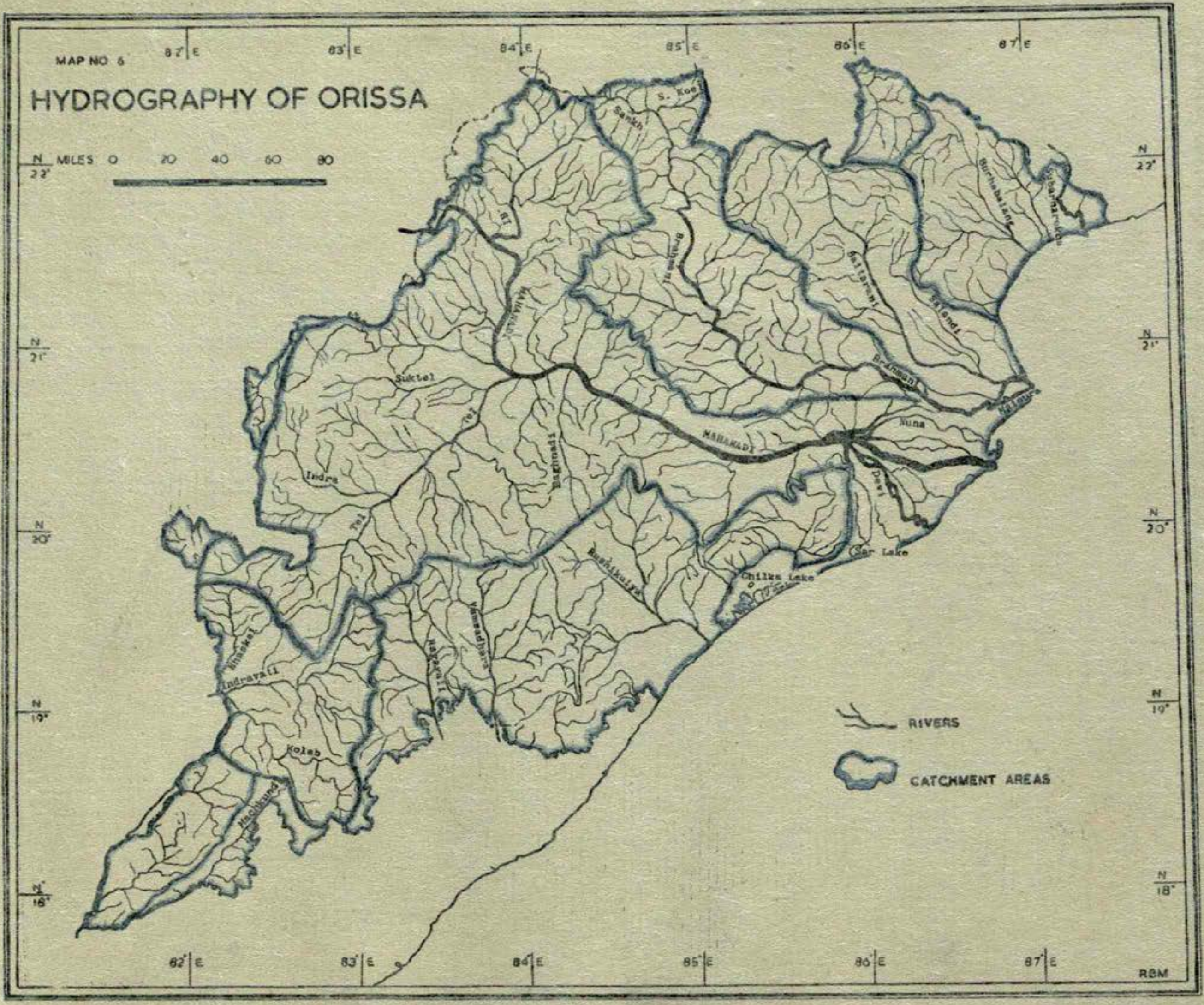
MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL



MAP NO. 5

SOILS OF ORISSA

ADAPTED FROM I.C.A.R. BULLETIN NO 73, FINAL REPORT OF THE ALL INDIA SOIL SURVEY SCHEME, DR B.N. SAHU'S BOOK 'LAND UTILISATION IN ORISSA' & SCHOKALSKY'S SOIL MAP



MAP NO. 6

HYDROGRAPHY OF ORISSA

2.15 Considering soil and topography it is clear that the major proportion of any increase in agricultural production will come from the delta area of the coastal region, the peneplains and river basins of the central tableland, the upland plain in Mayurbhanj and parts of Koraput, all of which are rice growing areas. The remainder of Orissa is physiographically less suitable for agricultural developement.

FUTURE DEVELOPMENT

Land Utilization

2.16 The total area of the State is 38·4 million acres,[1] of which about 36 per cent was cultivated in 1955-56. The remainder consisted of forests (23%), land not available for cultivation (16%), and pastures, tree crops and cultivable waste (17%) and fallows (8%). The proportion of net sown area to total area varies from region to region, but was, on the whole, higher than the State average in the coastal plains, equal to it in the central uplands, and less than it in the eastern ghats and the northern plateau. The proportion of cultivable wasteland to net area sown in the State was 46 per cent, as compared to 30 per cent in all-India. The proportion of area under long fallows was somewhat lower (5·3%) than in all-India (9·6%). The proportion of all fallows to net sown area, however, was 22 per cent—slightly higher than the all-India proportion of 19 per cent. This implies that the proportion of the area under short fallows is much higher in Orissa than in all-India. This fact is important because, generally, it is relatively easier to increase production by bringing short fallows under the plough, without incurring heavy reclamation costs.

2.17 The proportion of double cropped area to net sown area is 8 per cent in Orissa as compared to over 14 per cent in all-India. The proportion of double cropped area varies very widely between the districts, being as high as 29 per cent in Cuttack and as low as one per cent in Ganjam and two per cent in Balasore district.

Extension of Cultivation

2.18 The low proportion of double cropped area and the high proportion of cultivable waste and short fallows indicate that there is scope for increasing agricultural production by increasing the intensity of cultivation as well as by extending the area under crops. It is, however, preferable that the major increase in agricultural production, in the future, comes not through the extension of area, but through more intensive land utilization, as the capital costs of reclaiming land are high and reclaimed land takes time to yield high production.

2.19 On a broad assessment of possibilities of extending the area under crops, it is considered that during the next decade the existing cultivated area should be increased by about 800,000 acres, mainly by reducing short fallows. The estimated cost, at the rate of Rs. 190 per acre,[2] would be Rs. 15·2 crores and the additional foodgrains production would be about 140,000 tons.

2.20 These lands are mainly situated in Cuttack, Ganjam, Sambalpur and Kalahandi districts where fallows range between 26 to 38 per cent of net sown area. Besides, a million

---

[1] *Statistical Abstract, India,* 1957-58.

[2] This figure is based on *Second Five Year Plan, Orissa: Review of Progress, 1956-57 and 1957-58 and Plan 1958-59.*

GSL

acres in the coastal districts which are at present affected by inadequate drainage offer good scope for reclamation. But because of the heavy capital costs involved, development of these lands is not recommended during the next decade.

CURRENT CROP PATTERN

2.21 During the five years 1951–56, about three-fourths of the total cropped area was under foodgrains, the same proportion as in all-India. But in Orissa, rice predominates in the cropping pattern. Over 62 per cent of the total cropped area in 1955-56 was devoted to rice cultivation as compared to 22 per cent in all-India. Wheat, millets and other cereals are less important, occupying only 2·1 per cent of the cultivated area as against 22·6 per cent in all-India. Cash crops, viz., oilseeds, jute, sugarcane and cotton were also of minor significance, together covering 4·8 per cent of the cropped area as compared to the all-India figure of nearly 18 per cent.

2.22 The crop pattern shows some variation among the regions on account of the differences in soil, topography, rainfall and the availability of irrigation. With the exception of Sambalpur and Balasore where rice covers nine-tenths of the cultivated area, the proportion of total cropped area devoted to rice is, broadly speaking, slightly higher than the State average in the coastal districts and the central tract. The proportion is much higher than the average in the northern plateau and much lower in the eastern ghats region.

2.23 Despite the relatively low yields and low harvest prices, rice is one of the high value yielding crops in Orissa. As indicated in Table 12, rice accounted for 74·2 per cent of the total gross value of agricultural output while occupying only 62·3 per cent of the total cropped area. With higher yields and better prices it will become more profitable to grow rice. Therefore, no substantial change is suggested in the prevailing crop pattern. Except for the introduction of certain rabi crops, such as oilseeds, pulses and tobacco, and of cash crops such as sugarcane and jute it would be desirable to allow the preponderance of rice cultivation to continue for at least the next ten years.

2.24 In 1955-56, the area sown more than once was only about 8 per cent of the net sown area. The present national agricultural policy envisages a large increase in double cropped area in the next few years. It is estimated on the basis of irrigation facilities to be available expected by 1971, that the double cropped area can be increased to about two-fifths of the net sown area. This would increase the gross cropped area by about 4·5 million acres. It is suggested that diversification of cultivation in Orissa be secured by devoting this additional area to high value crops like sugarcane, tobacco and jute and to rabi crops like gram and pulses. This suggestion is amplified later.

IRRIGATION

2.25 In 1955-56 the total irrigated area in Orissa was 2·4 million acres—about 17·5 per cent of the total cropped area or the same proportion as in all-India. Of this, 23·1 per cent was served by canals, 50·6 per cent by tanks, 3·9 per cent by wells and the rest from other sources. Nearly 84 per cent of the total irrigated area was in the coastal plains and the central tableland, each region containing about half the area. Generally speaking, canals are more important in the former and tanks in the latter region.

2.26 On the whole, in recent years, while there has been a steady increase in the area irrigated by canals, and wells, there were wide fluctuations in the area irrigated by tanks and other sources largely due to variations in rainfall. Besides, the mortality of tanks in the State is high since there is no systematic effort to repair and restore existing tanks. The work is also hindered in the case of minor tanks by the prevailing form of ownership known as "Anchal Shatban".[1]

2.27 The average rainfall in Orissa exceeds 55 inches, but on account of its seasonal concentration, in most areas, some irrigation is necessary. Nearly all the existing irrigation in the State is used for the rice crop, being required either in May when the monsoon is late, or in September and October, when it is almost over. Very little irrigation is used for rabi crops.

A. Irrigation Potential for Major and Medium Projects

2.28 Due to favourable rainfall and physiography, Orissa has a large irrigation potential. The Central Water and Power Commission have estimated the future possibilities of irrigation from the major rivers of Orissa by schemes irrigating an area of more than 10,000 acres each, at 2·51 million acres. This does not include the two districts of Sundargarh and Bolangir and some river basins. When complete estimates are available the exploitable potential may increase to about 4 millions acres, which is about 29 per cent of the present net sown area.

2.29 Another estimate of the irrigation potential covering major and medium projects, has been worked out by the Irrigation Department of Orissa. This puts the potential at 6·045 million acres, distributed among the various districts as shown in Table 13. Over two-thirds of the large scale irrigation potential is concentrated in the two agriculturally important regions, viz., the coastal plain and the central tableland. It is estimated by the Irrigation Department that by 1986, 3·9 million acres of this potential can be exploited through 51 schemes costing Rs. 192·3 crores.

2.30 The estimation of the irrigation potential of given projects is not merely a technical matter, but also involves economic considerations. The inter-relationships among these factors are very important and must be borne in mind when choosing between irrigation projects, and between alternative cropping patterns on the area irrigated by a given project.

2.31 The State Government have proposed 16 major and medium irrigation projects to be undertaken during 1961–71 (Table 14). For want of necessary data, it has not been possible to examine the technical and economic aspects of these projects in the light of the criteria which should normally be followed in selecting irrigation projects. These criteria are given in Appendix 5 together with an illustration of their application. It is suggested that the State Government might appraise the project in the light of these criteria as selection of projects based on them would finally lead to larger social benefits.

2.32 The total cost of these projects is estimated at Rs. 128·1 crores. The net area that will be irrigated by these projects will be roughly 2·5 million acres, of which 150,000 acres may well be under sugarcane and the remainder under foodgrains. On this basis, the estimated additional production of sugarcane would be 2·7 million tons and 0·47 million tons of foodgrains.

---

[1] *The Report of the Minor Irrigation Committee*, 1953, Ministry of Food and Agriculture.

B. Minor Irrigation Potential

2.33 There are no estimates of the minor irrigation potential of Orissa. From the available information, however, an idea can be formed about the possibility of extending minor irrigation.

(*i*) *Diversion Works and Tanks*

2.34 Because of the heavy and seasonal rainfall, there are many streams that flow in the rainy season. It is possible to construct diversion works on these in most parts of Orissa. Often the streams in plateau areas have rocky beds providing good and cheap foundation for constructing storage reservoirs which can be used to irrigate even rabi crops. Except in the coastal areas it is also possible to construct tanks in most of the other regions. It is, therefore, suggested that a detailed survey of the availability of water from individual catchment areas be made to prepare a programme of tanks development.

(*ii*) *Ground-water*

2.35 *Wells.* There is large scope for constructing wells in the coastal areas. In other regions wells must be deep, and deepening of wells is difficult due to rock layers found at relatively shallow depths. High value crops like sugarcane, vegetables and potatoes will be benefited by well irrigation.

2.36 *Tube-wells.* Experimental borings under the Ground-Water Exploration Programme show that the coastal area has a large tube well potential. Tube-well development has been hampered by poor response from farmers. If tube-well irrigation is used to grow early paddy followed by a rabi crop like wheat, or if it is used to grow cash crops like sugarcane, it is likely to become popular. Another problem has been the shortage of cheap power. Power generation at Hirakud and Machkund will open good prospects for tube-wells in Cuttack, Puri and Ganjam districts.

2.37 On the basis of available information it is broadly estimated that an additional area of 1 million acres can be irrigated during 1961–71 through all minor irrigation projects including wells and tube-wells. On the basis of an average cost of Rs. 350 per acre, the total investment involved would be Rs. 35 crores. The estimated additional foodgrains production would be 200,000 tons.

2.38 Thus it is suggested that the irrigated area may be increased by 3·5 million acres between 1961 and 1971—an increase of over 100 per cent over the area expected to be irrigated in 1961.[1] The total additional foodgrains production is estimated to be 0·67 million tons.[2]

TECHNIQUES OF CULTIVATION

2.39 The backward techniques of cultivation are the most important cause of low land productivity in Orissa. The difference that improved techniques and fertilizers can make to yields is seen from the experiments on the Thana demonstration farms,[1] where average yield of 2,200 lbs. of rice per acre was obtained. This is about three times the present average yield in the State. Such a large increase may not be possible in field conditions but it serves to give an idea of the effect of improved techniques.

---

[1] It is estimated that about 3.35 million acres will be under irrigation through major, minor and light irrigation projects by the end of the Second Plan (*Draft Outline of Third Five Year Plan of Orissa*).

[2] This is solely due to irrigation. The effects of other inputs like fertilizers and improved seeds, etc., are a ssessed separately under respective heads.

2.40 Improved techniques comprise the use of fertilizers and manures, improved seeds and the adoption of better cultural practices. The likely impact of each of these constituents on agricultural production is estimated below.

Fertilizers and Manures

2.41 Soils in Orissa—as in the rest of the country—are deficient in nitrogen, while in many areas they are also poor in phosphates. Despite these deficiencies very little fertilizer—nitrogenous or phosphatic—is being used. In 1955-56, 10,000 tons of ammonium sulphate and 300 tons of super-phosphates were used giving an average of 1·3 lbs. of fertilizers per acre of cultivated land as compared to 3·5 lbs. in all-India. The consumption of fertilizers in 1960-61 is expected to be of the order of 30,000 tons of sulphate of ammonia and 4,000 tons of super-phosphate. The targets of consumption for the Third Plan are 200,000 tons of nitrogenous fertilizers and 50,000 tons of super-phosphate and bone-meal in the year 1965-66. This will give an average of about 22 lbs. of fertilizers per acre of cultivated area in Orissa.

2.42 By 1970-71 the irrigated area in the State is expected to increase to about 7 million acres. Assuming a dosage of 30 lbs. of nitrogen and phosphates (P_2O_5) per acre of irrigated land the annual fertilizer consumption potential of Orissa by 1970-71 would be 0·47 million tons of ammonium sulphate and 0·57 million tons of super-phosphate respectively.

2.43 Soils in many areas are reported to be fairly rich[2] in phosphates and therefore the dosage of phosphates assumed would be required only on a part of the total irrigated area. The actual requirement of phosphates would be therefore much less than the estimate of 0·57 million tons. In addition, there is a scarcity of phosphates in the country and this will continue in future as phosphate production is limited by the necessity to import phosphatic rocks. In view of the all-India product targets of phosphatic fertilizers, it is unlikely that Orissa would be in a position to obtain more than 100,000 tons of super-phosphate by 1970-71. The additional working capital required would be Rs. 3·5 crores and the estimated additional production of foodgrains would be 100,000 tons.

2.44 As regards the supply position of ammonium sulphate in 1970-71, it is estimated that the national output would, in that year, be 6 million tons. Orissa has about 12 per cent of the all-India area under rice. On the basis of fertilizer allocation (for all crops) according to rice area Orissa should get an annual supply of about 700,000 tons of nitrogenous fertilizers by 1970-71. The total cost of fertilizers used would be Rs. 28·9 crores. It is estimated that 50 per cent of the nitrogen fertilizers will be used for foodgrains. The total additional production of foodgrains would be 700,000 tons. The rest of the fertilizers will be used for increasing the yield of sugarcane, jute and oilseeds and other crops.

---

[1] These farms were set up under the scheme for Agricultural Extension Service in 1950. Each farm was about 5 acres in area, was cultivated with the help of bullocks, and run on a commercial basis. Dr. Bishwanath Sahu, *Land Utilisation in Orissa*, Orissa Government, 1951.

[2] *Final Report of the All-India Soil Survey Scheme*, ICAR, Bulletin No. 73, 1958.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
GSL

2.45 Orissa soils are reported to be deficient in organic matter. It has been estimated that 28 million tons of organic manure is required annually to maintain the fertility of the soil.[1] As against this, only 3 million tons of the estimated production of 9 million tons of farm yard manure goes to the soil, the remainder being used for fuel or wasted. The area under green manure, the other source of organic matter for the soil, was 5,000 acres in 1956 and was expected to rise to half a million acres in 1959. An ambitious programme for the production of compost has been drawn up for the Third Plan, the target being about 14 million tons of compost in the year 1965-66. This would yield an additional production of 0·5 million tons of foodgrains.

2.46 The practice of green manuring is increasingly becoming popular, largely because it is possible to grow green manure crops in the rice fields without interfering with the main crop. An important factor in favour of encouragement of green manures is that a good crop of leguminous green may add 40 to 60 lbs. nitrogen per acre in addition to organic matter. Considering the increase in area under green manures in recent years, and the proposed increase in irrigated area to about 7 million acres it is suggested that the area under green manuring crops be raised to 5 million acres by 1970-71.[2] The estimated increase in foodgrain production would be about 0·6 million tons.

2.47 The total increase in foodgrains through the use of fertilizers and manures by 1970-71 would thus be 1·4 million tons.

Improved Seeds

2.48 In 1955-56 improved seeds were utilized in only 10 per cent of the total area under rice, as compared to 70 per cent in the neighbouring State of Andhra Pradesh. The tardy adoption of improved seeds is largely due to shortage of supply and the ineffective extension machinery. The 39 seed farms in the State in 1956 were planned to be increased to 139 by 1961. The target is likely to be achieved. The objective should be to have one seed farm in each N.E.S. block. Since the whole State is to be covered by 307 blocks, 168 more seed farms would require to be established by 1971. However, in the Third Five Year Plan only 10 more seed farms are proposed to be established for development purposes in the ayacut of irrigation projects. The production of nucleus seed for these farms is proposed to be stepped up from 1,300 tons in 1960-61 to 3,000 tons in 1965-66. These together with the improved seeds mutually exchanged amongst cultivators are expected to yield additional output of 250,000 tons by 1965-66. It is suggested that all the area under rice should be brought under improved seeds by 1970 whether through organization of seed farms in each block or through mutual exchange of improved seeds among cultivators, the likely increase in rice production would be 0·5 million tons.

Improved Practices

2.49 There is plenty of scope for improving the prevailing cultivation practices. Losses due to diseases and pests are estimated to be quite substantial. These can be minimized by adopting clean cultivation methods and replacing indigenous seeds with disease resistant strains. Line sowing of jute, the Japanese method of paddy cultivation in place of the present practice of broadcast sowing, proper crop rotation, deep ploughing, use of better implements, dry farming techniques, etc., are all likely to lead to a large increase in production. It is estimated that yields per acre will increase by at least 10 per cent if these practices are adopted. However, considering the magnitude of the task to be accomplished over the next 10 years, the efforts of the State Government in this direction will have to be considerably intensified. With such effort, it is possible to increase foodgrains production in the State by at least 300,000 tons annually. The State Agriculture Department has been trying for over a decade now through persuasion, demonstration and propaganda to induce the cultivators to adopt better methods and practices.

---

[1] Report of the Working Group on Manures and Fertilizers: Proposals for the Third Five Year Plan and thereafter.

[2] The State Government proposes a target of 7 million acres to be brought under green manuring by the end of the Third Five Year Plan. This appears to be too high a figure, considering the past trends. During 1956-57 to 1960-61, the area under green manure is estimated to have increased from 5,000 to 500,000 acres, i.e., at the rate of roughly 100,000 acres annually. The rate of extra coverage would have to be stepped up by 14 times to reach the target of 7 million acres within 5 years. This seems rather ambitious.

SOIL CONSERVATION

2.50 The problem of soil erosion is particularly serious in the eastern ghats and parts of the northern plateau. The tribal population in these areas practises shifting cultivation which destroys forests and creates conditions of intense soil erosion. It is estimated that about one-fifth of Orissa is affected by this system of cultivation. The tribal population must be persuaded to adopt better methods of cultivation and a programme of settling them on permanent farms be implemented. Systematic afforestation of the affected area should also be undertaken. Cashewnut plantations should be extended in these areas, because apart from preventing soil erosion, they begin to yield fruit from fifth to seventh year and can be a source of earning foreign exchange. Under the auspices of the Soil Conservation Organization, extensive areas have been planted with cashewnuts, and during Third Plan, various soil conservation measures are proposed to be taken in the shifting cultivation areas.

2.51 In addition, contour bunding, terracing and the construction of field bunds are necessary to prevent and check the erosion in open and undulating areas. It is estimated that two million acres of cultivated land is affected. It is considered essential that as much as possible of the affected areas should be covered by soil protection measures by 1970-71. This programme is estimated to entail an outlay of Rs. 8 crores. In view, however, of the State Third Plan's relatively modest target of 300,000 acres for soil conservation programme, it is suggested that the Government should enlist the cooperation of the farmers by giving them adequate incentives to do it on their own, to accomplish full coverage by 1971.

2.52 The necessity of tackling the problem of erosion will be greater in the future with the development of large and medium scale irrigation projects. Soil erosion in the catchment areas of the reservoirs would reduce the storage capacity through heavy silting. It is suggested, therefore, that the State outlay on irrigation schemes should be utilized for protecting the catchment areas against erosion.

CROPS SUGGESTED

2.53 It has been suggested earlier that no fundamental change in the prevailing crop pattern is necessary for raising the value of total agricultural output. Rice should continue to be the major crop of Orissa, but by raising the proportion of double cropped area to 40 per cent of total cultivated area, the acreage under high value cash crops like jute and tobacco and rabi crops such as

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

oilseeds and pulses should be increased by 4·5 million acres. This addition to total cultivated area, it is suggested, should be allocated as indicated below.

Jute

2.54 Jute is an important cash crop in Orissa covering 91,000 acres in 1956-57. The quality of Orissa jute is very good and most of it is exported to Calcutta. About 70 per cent of the total output of the State comes from Cuttack district. The average yield per acre is about 800 lbs. or 10 per cent lower than the national average. This is mainly on account of lack of adequate irrigation. With irrigation and improved techniques, the yield can be raised to 1,500 lbs. per acre. With the completion of the Delta Irrigation Scheme, it should be possible to extend the area under jute in the coastal districts. Besides, an important factor in favour of jute is that land used for it can be used also for mid kharif and rabi crops. The area under jute should, therefore, be expanded by at least 0·5 million acres.[1] It is estimated that if this is done, the additional annual output of jute in Orissa by 1970-71 would be 1·87 million bales.

Tobacco

2.55 Covering about 11,000 acres, tobacco is a minor crop. Orissa is not suited to the cultivation of cigarette tobacco and most of the crop consists of inferior tobacco used for *bidi* manufacture and chewing purposes. Orissa imports annually about Rs. 75 lakhs worth of tobacco, mostly raw material for the *bidi* industry. In order to meet the bulk of the requirements of this industry from indigenous production and in view of the possibilities of increasing tobacco cultivation, it is suggested that the area under tobacco be extended by about 50,000 acres mostly in the districts of Kalahandi, Koraput and Sambalpur and also Hirakud Project areas. The estimated increase in tobacco output will be about 3 million lbs. annually. To make this order of development possible, provision of adequate curing facilities is essential.

Oilseeds

2.56 At present 60,000 acres of groundnuts, 25,000 acres of linseed and 125,000 acres of rape and mustard are cultivated. Due to inefficient techniques, the average yield of oilseeds is only 276 lbs. per acre, which is about two-thirds of the average all-India yield. With improved practices it is not difficult to raise yields by 50 to 80 per cent over the present level. With higher yields, it would become profitable to expand the area under oilseeds during 1961–71. It is estimated that an additional 0·3 million acres of groundnuts, 0·2 million acres of linseed, and 0·3 million acres of rape and mustard can be cultivated.[2] This will lead to an additional annual production of about 134,000 tons of groundnuts, 27,000 tons of linseed and about 70,000 tons of rape and mustard by 1971.

Pulses

2.57 Pulses are cultivated on about 1·16 million acres, or 8 per cent of the total cropped area, and the production is about 0·245 million tons annually. At present Orissa exports large quantities of pulses, even though per capita consumption of pulses in the State is very low. Growing pulses has the advantage of enriching the soil with nitrogen in which the soils of Orissa are very poor. After making the requirements of jute, oilseeds and tobacco, about 3·3 million acres out of 4·5 million acres of double cropped area will be available. Since pulses can be grown all over the State and in view of the great deficiency of proteins in the diet and the need for balanced crop pattern, it is suggested that all this land be brought under pulses by 1970-71. The estimated increase in output of pulses will be about 0·7 million tons.

---

[1] Based on discussions with the Indian Central Jute Committee and State Officials. The State's Third Plan target for area under jute is 0.21 million acres.

[2] Based on discussion with State Government Officials and the estimates of the Central Oilseeds Committee for all-India.

2.58 The extension of double cropping suggested would not be possible without controlling the prevailing practice of public grazing of livestock immediately after the kharif harvest. At present, to grow a second crop, farmers have to fence their fields to protect the crops from the grazing cattle. Fencing of the entire double cropped area would involve enormous expense which the cultivators cannot undertake. It would be necessary, therefore, to control indiscriminate grazing through institutions, such as panchayats.

Sugarcane

2.59 In addition to the extension of cultivation of tobacco, jute, oilseeds and pulses indicated above, some expansion of sugarcane production is also envisaged. The average yield of sugarcane in Orissa in 1956-57 was 36,690 lbs. per acre as compared to the all-India yield of 26,000 lbs. The yields in Koraput, which is the most important sugarcane district, are over twice as high as the national average. Since the natural factors like soil and climate are favourable for cane, it is possible to raise the present high yields even further by adopting improved techniques of cultivation. However, the absence of a sugar industry in the State and lack of stable irrigation facilities in Koraput have led to stagnation of the acreage under cane. With the proposed development of irrigation facilities and the expected higher yields, it would be feasible to extend the area under sugarcane, by 150,000 acres by 1970-71, mostly in the districts of Koraput, Sundargarh, Kalahandi and Dhenkanal. It is estimated that this would lead to the production of 3 million tons of cane annually. The land for cultivating sugarcane may be secured by diverting one per cent of the area at present under rice.

Cotton

2.60 The State produces about 1,000 bales of cotton annually, all of which is of short staple variety. The soil and climatic conditions are not very suitable for cotton cultivation as is evident from the poor yields. The per acre yield of cotton in the State is about 34 lbs. as against the all-India average of 92 lbs. Comparable figures for other States are—Punjab 222 lbs., Uttar Pradesh 122 lbs., Bihar 78 lbs. and Andhra Pradesh 53 lbs. The average yields in Orissa are the lowest and compare unfavourably even with the yields in the neighbouring States. They have to be increased by more than one and a half times to reach the all-India average which itself is considered very low. At present, an acre under cotton yields about Rs. 70 (gross value of output) while the farmer can get about Rs. 170 per acre from rice cultivation. From this it appears that diversion of area from rice to cotton is not advantageous. However, from the State's Third Plan, it appears that the State Government is anxious to bring a sizable area under cotton cultivation. This should be done by bringing new land under cotton cultivation rather than by substituting it for rice.

TRANSPORT AND MARKETING

2.61 Poor transport and marketing facilities hamper agricultural development by removing incentives for improvement. The cultivator, finding it difficult to sell his surplus at economic prices, tends to carry on subsistence farming. The harvest prices of rice are unusually low in the State, largely because of the lack of an adequate transport system which creates a glut in the areas with a large marketable surplus. In 1955-56, the annual average harvest price of rice was only Rs. 12·77 per maund in Orissa, while it was about Rs. 14 to 16 in West Bengal and Bihar and between Rs. 17 and 18 in Madras and Andhra.[1] Measures to increase agricultural production without improvement in transport and marketing would be self-defeating.

2.62 In 1956, Orissa had 13·5 miles of roads for every 100 square miles of area as compared to the all-India average of 21 miles. Besides inadequate transport facilities, there are relatively few towns in the State that can serve as marketing centres. In 1951, Orissa had one town for every 1,542 sq. miles as against one town for every 421 sq. miles in all-India. A town in Orissa thus has to serve the marketing needs of a much larger area than in all-India.

2.63 There is one principal market for 2,400 sq. miles of area in Orissa as compared with one for every 630 sq. miles in all-India. Of the 25 principal marketing centres in the State, nearly half are in Cuttack, Balasore, Ganjam and Koraput districts and only six of them are rail-heads. Warehousing facilities are practically non-existent. Absence of proper marketing facilities has hindered the production of cotton in Sambalpur, of oilseeds in Keonjhar and of oranges in Ganjam.

2.64 It must be emphasized that in a region where agriculture is as poor as in Orissa, farmers cannot be expected to make any marked improvement in their techniques of cultivation and farming practices unless they are assured of reasonable prices for at least major crops. In Orissa this has particular relevance to rice because of its predominance.

2.65 One way of helping the farmers to get better prices would be to improve transport, warehousing and marketing facilities. Development of transport facilities would make it possible for the farmers in surplus areas to take advantage of better prices even in distant markets. However, full benefits of improved transport facilities would accrue to the farmers only if a sufficiently large number of markets with warehousing facilities were organized under the supervision of the State Government and the growth of marketing and service cooperatives were encouraged.

2.66 While the improvements suggested above would undoubtedly help in giving better prices to the farmers, uniformly good prices cannot be guaranteed unless the State Government impress upon the Central Government the need for fixing floor and ceiling prices for rice well in advance of the sowing season and for a Government programme of buying rice when prices touch the floor and of selling when they exceed the ceiling.

2.67 Extension of road mileage, improvement of existing roads, construction of warehouses and establishment of regulated markets throughout the State are necessary conditions for the successful implementation of the programme of agricultural development outlined above.

---

[1] *Agricultural Prices in India,* 1957, Ministry of Food and Agriculture, p. 43.

PRODUCTION

2.68 In 1956-57, Orissa produced a total of 3·49 million tons of foodgrains, consisting of 3·13 million tons of rice, 90,000 tons of millets and other cereals, and 270,000 tons of pulses. In the same year production of sugarcane amounted to about 0·9 million tons, that of oilseeds 60,000 tons and of jute 180,000 bales. In 1960-61, the production of foodgrains would increase to 4 million tons, that of oilseeds to 90,000 tons, of jute to 265,000 bales and of sugarcane to 1·07 million tons. The net value of agricultural output in 1960-61 is estimated to be Rs. 164·74 crores.[1]

2.69 If all the development possibilities suggested in this report are fully realized, the production of foodgrains should increase in 1970-71[2] by 4·3 million tons, of oilseeds by 0·32 million tons, of jute by 0·75 million bales and of sugarcane by 3 million tons (Table 16). The net value of agricultural production would increase to Rs. 343·11 crores[3] by 1970-71—an increase of 108 per cent over 1960-61 level.

2.70 Growth of agricultural production at an annual rate of 10·8 per cent, though technically feasible, may be considered too high. Total foodgrains production in the country increased by about 40 per cent during 1951–60 or at an annual rate of about 4 per cent. The annual average rates of increase in the neighbouring States of Andhra Pradesh and West Bengal were 4·5 per cent and 1·5 per cent respectively. Comparable figures are not available for Orissa since the figures for later years in this State have been substantially revised, but the available evidence suggests that the rate of increase was much less than the all-India average. In the Draft Outline of Third Five Year Plan (all-India), the increase in agricultural production is envisaged to be of the order of 30 to 33 per cent, i.e., 6·5 per cent per annum. This may well be the rate of increase of agricultural production in Orissa also. It would bring down the targets of increase in agricultural production to about 60 per cent of the technically feasible level.

2.71 Even this would require an immense organizational effort. The most important step would be to strengthen the agricultural extension service. At present the extension service in Orissa is inadequate in relation to the magnitude of the task involved. In 1957-58, there were 124 NES Blocks in Orissa as compared to the 307 blocks, of 160 villages each, that were considered necessary. There was an extension expert for every 105 villages, and one village level worker for every 16 villages. The quality and training of the village level worker were also quite inadequate. A big improvement in the extension service is essential if the target of agricultural development is to be achieved.

2.72 The Agricultural Personnel Committee has suggested a ratio of one village worker for five villages. This means an additional requirement of 9,780 village level workers. It is also suggested that there should be six experts in each NES Block.[4] Not only is an expansion of the extension service and an increase in extension personnel necessary but an improvement in quality is also essential. Thus a large training programme is required. The estimated cost of the programme would be about Rs. 1·7 crores annually.

---

[1] NCAER estimate (at 1956-57 prices).

[2] The targets proposed in the Third Five Year Plan of the State suggest increase of foodgrains production to 5·5 million tons, of oilseeds to 200,000 tons, of jute to 465,000 bales and of sugar to 200,000 tons.

[3] NCAER estimates.

[4] One expert each on agriculture, horticulture, soil science, plant protection and engineering in addition to one farm manager for each NES Block farm.

62- 6378

13 SEP 1962

CONSUMPTION

2.73 Foodgrain production in 1961 is expected to be around 4 million tons. With a population of 17·6 million, and making an allowance of 10 per cent of output for seed and wastage, and 0·30 million tons for exports outside the State, the availability of foodgrains per capita is at present about 18·4 ozs. per day. In terms of adult units, the availability would be 22·5 ozs. per day, broken down roughly into 20·5 ozs. of cereals and 2 ozs. of pulses. This is broadly in agreement with the findings of recent surveys made in the State.[1]

2.74 Working on the basis of Planning Commission estimate of a standard diet of 15 ozs. of cereals and 3 ozs. of pulses per capita per day, the present consumption of cereals in Orissa is somewhat higher and that of pulses lower than the nutritional requirements.

2.75 On the assumption that with rising incomes, consumption of non-foodgrains would increase and that of foodgrains would be brought to the level of 18 ozs. per capita per day, the estimated consumption of 21·35 million persons in 1971[2] would be 3·3 million tons of cereals and 0·66 million tons of pulses. Comparing this with the estimated production of 5·86 million tons of cereals and 0·72 million tons of pulses in 1971, it will be seen that Orissa would have a surplus of 1·97 million tons of cereals (mostly rice).[3] Assuming that some part of the total production is consumed by livestock, the actual surplus of foodgrains would be roughly about 1·8 million tons.

INVESTMENT AND OUTPUT

2.76 The investment requirement for implementing the programme of agricultural development outlined here is estimated at about Rs. 212·3 crores (Table 15). It has already been indicated that it is technically feasible for this order of investment to yield an additional output of Rs. 178·37 crores, which gives a capital-output ratio of 1·19: 1. However, if the rate of achievement is roughly the same as the all-India rate envisaged in the Third Plan, i.e., about 6·5 per cent per annum, the increase in farm output would be of Rs. 107 crores, raising the capital-output ratio to 2:1. This is by no means a high ratio considering the programme of development and the pattern of investment suggested here. The implications of this in terms of increase in output, employment and productivity may be briefly stated as follows. Even the achievement of 6·5 per cent rate of increase of agricultural production per year will raise productivity per worker in 1971 by about 45 per cent, assuming that the working force in agriculture increases at the rate at which total population grows, and that there is no transfer of labour out of agriculture. With the development of mining and large scale industries proposed later in this report and the related growth of trade and commerce, there will be movement out of farms and villages. This will reduce the proportion of working population remaining in agriculture. Moreover, with the spread of education, the participation of children in farm work is likely to decline. This will tend to lower the number of workers on farms and, given the rate of increase of agricultural output, will increase productivity per worker. In agriculture, the problem is not so much the creation of more employment as of increasing the productivity of land and working force.

---

[1] The Indian Council of Medical Research Survey (1951) yielded a per capita consumption figure of 16·7 ozs. per day, the NSS (1952) revealed a consumption of 19·93 ozs. for rural families, and the First Agricultural Labour Inquiry of 17·4 ozs. Diet surveys conducted in development blocks recently by Orissa Health Directorate give a higher figure—the range of cereal consumption being 23 to 29 ozs. per capita.

[2] NCAER Projections (Provisional) based on 1961 population figures.

[3] After making allowance of 10 per cent of production for seed and wastage.

2.77 Land productivity can be increased by utilization of inputs like improved seeds, fertilizers, etc. For increasing labour productivity in agriculture, developments have to take place mainly outside agriculture. However, agriculture itself can contribute in this process substantially through the development of a number of processing industries and related developments in transport, communications, trade and commerce. The increase in income consequent upon increase in agricultural productivity will lead to a greater demand for non-farm products. This will have secondary multiplier effects on employment and income through the provision of necessary wage goods for industrial employment.

2.78 The all-round development of the State in various spheres suggested in this and subsequent chapters will be greatly facilitated by the accrual of a large agricultural surplus in exchange for which Orissa may get its requirements of industrial goods and machinery. For, to be sure, despite the growth of industries as envisaged in this report, Orissa will have to remain largely an agricultural State for some years to come. Its dependence on rice production cannot be appreciably reduced because rice accounts for about two-thirds of the total cultivated area and about three-fourths of total agricultural output. Nor is there any need to do so provided the yield per acre of rice can be increased substantially; there is demand for rice elsewhere in the country and price of rice can be stabilized. In view of the deficit of rice which is likely to persist in the country for another decade or so, Orissa will have to continue to export rice to other areas. The wholesale price of rice in Orissa has in the past few years shown a tendency to come up to the level of prices elsewhere. This is encouraging and every effort should be made to stabilize rice prices specially at the farm level to give full benefit of the measure to the farmers. Otherwise there is the danger of the targets being not realized due to frequent gluts and price fluctuations. Once this is done, the problem of marketable surplus will be taken care of by the large demand that exists in the country. Further, some diversification of the economy will be provided by increase in production of pulses, oilseeds, jute and sugarcane proposed here which, though not significantly altering the crop pattern, will yet introduce a change inasmuch as it will increase the output of cash crops, expand the monetized sector, and in general, reduce the present isolation of the farmers. All this will be reflected in their attitude towards investment, the form it should take and the rate at which improvements should be brought about. All these and other changes that will come about in the agricultural sector cannot be ascribed to the agricultural development programme alone, since development is an integrated process in which changes in different sectors act and react on one another. The programme of agricultural development will nevertheless provide a base for putting the economy of Orissa on a productive basis besides adding directly to output and employment in the agricultural sector.

GSL

Chapter 3

Animal Husbandry

In 1956-57, THE NET value of livestock output of Orissa was estimated at Rs. 14·43 crores. This formed 4·7 per cent of the total State income and 8·8 per cent of income from agriculture (i.e., cultivation and livestock raising). This compared unfavourably with the corresponding all-India proportions of 6·5 per cent and 14 per cent respectively.

3.2 One reason for the lower contribution of animal husbandry to farm output can be the smaller number of livestock—or more pertinently, the bovine population—relative to cultivated land. Since, however, the density of bovine population per acre of cultivated area is almost the same (1: 1·6) as in all-India, the explanation for this should be found in the lower productivity of the livestock in the State. The average annual milk yield of a cow is 250 lbs., and that of a she-buffalo 600 lbs. in Orissa, whereas the corresponding figures for all-India were 361 lbs. and 970 lbs.[1]

3.3 The absence of good breeds amongst the cattle, inadequate feeding, lack of adequate veterinary facilities and poor care and management are the causes of the low productivity.

Breed

3.4 Orissa has no indigenous breed of cattle. The cattle of the State are non-descript and are of poor quality both in respect of milk yields and draft capacity. The major types of these found generally in different regions of the State and their average milk yields are as follows:

Type	*Region*	*Average milk yield per lactation* (in lbs.)
Ghumsur	Bhanjanagar (Ganjam)	650
Binjharpuri	Bari area (Cuttack)	975
Khariar	Nawapara Subdivision of Kalahandi district	550
Matto	Koraput district	N.A.

These milk yields compared to those of Hariana (2,100 lbs.) and Red Sindhi (3,147 lbs.) breeds are low and are indicative of the extremely poor quality.

Feed

3.5 The cattle in Orissa are ill-fed. On the basis of a norm of 15 lbs. of roughage and one pound of concentrate per adult cattle, the total daily fodder requirements for Orissa cattle is estimated at 54,000 tons of roughages and 3,600 tons of concentrates. As compared to this, only 10,000 tons of roughages and 1,000 tons of concentrates were available in 1948.[2]

---

[1] *All-India Livestock Statistics*, 1957.

[2] Dr. Bishwanath Sahu, *Op. cit.*

3.6 The usual cattle feed in the State is paddy straw. This is a poor feed with nutritive ratio of 1: 40, whereas for milk and growth of cattle, the required nutritive ratio is 1: 10. The natural grazing facilities are also very inadequate. It is estimated that there are about 4 million acres of grazing land in the State, but due to neglect, soil erosion and over-grazing, the lands are mostly barren except for a couple of months during the rainy season. In addition animals are rarely given oilcakes.

Cattle Composition

3.7 There were 9·11 million cattle and buffaloes in Orissa in 1957 (Table 17). They constituted the bulk (75%) of the State livestock population, and were a more important part of it than their counterparts in India (65%). However, the composition of the bovine population in India was better with a larger proportion (20%) of buffaloes which are comparatively superior milk-yielding animals, than in Orissa (9%). (Table 17)

Draught Animals

3.8 Of the total bovine population, 4·06 million or 44 per cent were working animals. This implies that there were 27 draught animals for every 100 acres of gross cropped area as against 19 in all-India. Despite the same density of cattle population per cultivated acre there were thus more working animals to total cropped area in Orissa than in India as a whole. The use of a larger number of draught animals per unit cultivated land is indicative of the poor performance of the working stock in Orissa.

Milch Cattle

3.9 In 1957, Orissa had about 1·016 million cattle in milk, giving a ratio of 6·2 per 100 persons, as against 8·1 per 100 in India. Buffaloes which are heavy yielders of milk formed 11 per cent of the milch cattle in the State as compared to 34 per cent in all-India. The adverse effects of this on milk production in the State were further increased by the low annual average yield of milk of Orissa cattle. The annual production of milk in the State is estimated at roughly 0·4 million tons. The availability of milk in Orissa is thus about 1·5 ozs. per capita per day, as compared to 5·8 ozs. in the country as a whole.

3.10 To attain even the present national consumption level in the State by 1971, the production of milk would have to be increased to about 1·18 million tons a year, or by 400 per cent. To raise milk availability to the level of 1 lb. per capita per day prescribed by modern health standards, an increase of about 10 times in present production would be necessary.

Better Feeding

3.11 The improvement of livestock in Orissa rests mainly on measures which would upgrade the existing breed of cattle and provide them with better feed. Cattle productivity, especially milk yields, can be increased by as much as 100 per cent within a short period by adequate feeding alone. Balanced feeding is a pre-requisite for any scheme of livestock development. Since cattle feeds are mostly agricultural by-products, the increase in agricultural production proposed in the next decade will satisfy much of the requirements. The increased production of pulses and oilseeds and other rabi crops would increase the supply of oilcakes and pulse wastes. Since rice will continue to be a major crop, the roughages feed available within the State would be mostly paddy straw, which is nutritively poor. The nutritive value of paddy straw can be improved by soaking the straw in mild lime water for about 30 minutes before feeding. This practice should be popularized. Agricultural extension workers should also try to increase the cultivation of fodder crops like jowar and bajra and of silage grass. Leguminous rabi fodders like lucerne can also be grown in the State. Besides, wide publicity should be given among cattle owners to use forest by-products as cattle-feeds, whereby millions of maunds of these products which are at present wasted, could provide nutrition to the under-fed and half-starved cattle of the State. Further, wastage of fodder could be avoided or minimized if chaffed before feeding.

3.12 The cattle of Orissa show symptoms of acute mineral deficiencies, especially of calcium and phosphates. In most areas, soils are poor in these minerals and this may lead to low mineral content in the feeds given to cattle. A State-wise nutritional sample survey should, therefore, be conducted to investigate into this matter. It is suggested that steps be taken to correct this situation by supplementing animal feed with readily assimilable mineral mixture. The State may supply this at subsidized rates.

Upgrading Cattle

3.13 The usual methods for improving the quality of cattle are upgrading by introducing new and better breeds, castration of useless cattle and control of diseases, besides checking indiscriminate breeding by scrub and inferior bulls. All these measures should be adopted in Orissa. As the State has no indigenous breed worth developing, the upgrading will have to be done through suitable breeds from other areas. The State requires a good dual purpose cattle and a systematic breeding programme should be undertaken. The dual purpose Hariana breed of Punjab is perhaps most suited for Orissa.

3.14 There is a great demand for Hariana bulls all over India and it will therefore be difficult to procure an adequate number of good bulls. This can be overcome by resorting to artificial insemination. The cattle and buffalo population of Orissa is over 9·11 million, of which about 2·5 million are breeding cattle. To cover all the cattle under this programme would require about 180 main artificial insemination centres as against the Second Plan provision of 16 such centres, and the First Plan target of 10 centres. The proposed upgrading programme would, therefore, require 154 additional main insemination centres.

3.15 For an upgrading programme to be effective, it is very necessary to eliminate all the local bulls to check indiscriminate breeding. So a compulsory castration programme should be launched when upgrading is introduced in any area. It would be desirable to introduce the programme in contiguous areas in gradual stages. So far, the results have been encouraging only in the coastal districts. The cooperation from the farmers in the interior is likely to be less due to backwardness. This should be countered by a more intensive extension activity in such areas.

Veterinary Facilities

3.16 In Orissa, there are at present only 182 veterinary dispensaries and 793 veterinary

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
GSL

stockmen centres, which means there is one veterinary dispensary for 50,000 cattle and one stockmen centre for 11,500 cattle. Orissa is poorly served with veterinary facilities. The incidence of diseases and mortality rate are very high in the State. Efforts are being made to tackle the situation, and, as a first step, a veterinary college has been started with provision for admission of 80 graduates annually, which has since 1959-60 been increased to 120.

3.17 It is suggested that veterinary dispensaries at the rate of 2 per NES block should be opened all over the State. This means that about 250 additional dispensaries would have to be established during 1961–71. The personnel requirements of these clinics may be met by full utilization of the training capacity of the veterinary college.

DAIRY DEVELOPMENT

3.18 At present unadulterated and hygienic milk is not available anywhere in the State. The urban milk supply depends on a few urban "dairies" and the surrounding villages. Due to lack of adequate transport and marketing facilities, marketable surplus of milk, even where it exists in the rural areas, does not reach consumption centres. With the proposed cattle development measures and the subsequent increase in milk production, larger marketable surpluses will arise which have to be sold in urban markets because the rural people in Orissa consume very little milk. Therefore, unless marketing and transport facilities are provided and arrangements made to lift these surpluses at fair prices, the farmers are not likely to be interested in the proposed development programme.

3.19 It has been experienced that the establishment of milk unions and the consequent appearance of an assured market for milk creates among the farmers an incentive for the adoption of measures to improve milk yields. Thus milk unions can accelerate the implementation of a livestock development programme. It is suggested, therefore, that milk unions be established in different parts of the State.

3.20 The State is having one milk project at Cuttack (Phulnakhra) under the Second Plan and another is proposed at Berhampur during the Third Plan period. A milk colony scheme for Rourkela on the Aarey Colony (Bombay) pattern is proposed to meet the needs of the growing steel town. A creamery for Kujang (Cuttack district) and a milk collection and marketing scheme for Bari area for supply of milk to Jajpur are proposed.

3.21 The national policy is to establish milk unions to serve all urban areas with a population of over 50,000. Orissa, at present, has only three cities with a population of above 50,000. However, with the proposed programme for the development of large scale industries, urbanization in the State may be expected to proceed at a high rate. In view of this it is suggested that in addition to Cuttack, Berhampur, Puri and Rourkela, milk unions be established in another 8 to 10 growing centres, e.g., Rajgangpur, Brajrajnagar, Hirakud, Jeypore, Rayagada, etc. In Cuttack, Berhampur, Puri and Rourkela there should also be a composite milk plant with a capacity to handle 100 maunds of milk per day.

3.22 Milk unions can draw only part of the surplus of a limited area. There are many milk producing pockets in the State with surplus production which will increase with livestock development. In these areas, rural creameries may be established to process the milk into milk products like butter, ghee, casein and cheese. These products are at present imported from Andhra and Bihar and the demand in the future is likely to increase with population and incomes. Four rural creameries should be established in the vicinity of Parlakhemidi, Baripada, and Sambalpur, as these are known to be milk surplus areas. The capacity per day of the creamery in Parlakhemidi should be about 100 maunds and that of others 50 maunds each.

3.23 Livestock is also the source of raw materials for a number of manufacturing industries, such as tanning and leather products, bone-meal, gelatine, wool, etc. Very little industrial use of these products is at present being made within the State. Orissa is a net exporter of raw hides and bones. On an average it exports 3,000 tons of raw hide and over a thousand tons of bones per year, mainly to Calcutta and Madras. Industries based on these materials could be established in the State. Specific suggestions regarding development of these industries have been made in the chapter on Small Scale Industries.

POULTRY DEVELOPMENT

3.24 Orissa has four and a half million fowls and nearly two million ducks. The birds are mostly of indigenous breeds with an average egg laying capacity of only 40 a year. The management of the birds is also very primitive. With improvement in breeds and scientific management, it is possible to develop the poultry industry in a fairly short period. White Leghorns and Rhode Island Reds perform very well under Orissa conditions and poultry farms should be organized with the object of multiplying and distributing these breeds. There are three poultry farms in the State—at Augul, Koraput and Sundargarh. Besides, there are small poultry units in 80 veterinary dispensaries and 9 demonstration poultry farms under the All-India Poultry Development Schemes. There should be one poultry farm in each Community Development Block if substantial results are to be expected and this is contemplated by the Third Five Year Plan of the State. These farms should distribute the improved birds to intending keepers at low prices and should also serve as demonstration centres. Due to unhygienic conditions and bad management there is a heavy mortality of birds. Adequate measures should also be taken by the Veterinary Department to control diseases like tick fever.

3.25 Orissa has large inland water areas ideally suited for duck rearing. There is a great demand for ducks' eggs within the State and there are excellent possibilities of developing duck rearing on the same lines as indicated for fowl rearing. Some steps in this direction have been taken under the All-India Poultry Development Scheme and similar schemes have been proposed under the Third Five Year Plan, including starting of three duck rearing centres.

3.26 The internal demand for the products of the poultry industry is likely to rise in the future with increasing population and rising per capita incomes. Calcutta provides export market large enough to abosrb any surplus production within the State. At present Calcutta imports eggs from Madras and Andhra Pradesh over a distance of more than 700 miles. Orissa has a direct rail-link with Calcutta and therefore poultry products can be sent cheaply and quickly.

3.27 However, marketing of eggs and poultry has to be organized if advantage is to be taken of the favourable demand conditions. It is suggested that marketing cooperatives be established in all parts of the State to ensure the efficient collection and distribution of the output. This will also provide the poultry farmers incentive to improve breeds and management. The Block Poultry scheme which has been taken up in 57 blocks is proposed to be extended to all the blocks during the Third Plan period.

INVESTMENT

3.28 The investment required for the animal husbandry development programme discussed above is estimated at about Rs. 8 crores during 1961–71. This would consist of an expenditure of Rs. 3·4 crores on 154 main artificial insemination centres, of Rs. 2·5 crores on the establishment of 250 veterinary clinics, and of Rs. 1·2 crores on setting up of poultry farms in each Community Development Block as suggested. The composite milk plants and the creameries recommended to further dairy development are estimated to cost about Rs. 49 lakhs. About Rs. 10 lakhs should be spent on the establishment of milk unions in the State. The balance of Rs. 31 lakhs may be spent on miscellaneous measures for animal husbandry development. A sum of Rs. 3·76 crores has been proposed for animal husbandry, dairying and milk supply under the State's Third Plan.

Output and Employment

3.29 A large proportion of the investment proposed is for upgrading of breeds, which would not yield tangible results in the present decade. Normally, it is expected that measures designed to improve the breeds through artificial insemination would require three animal generations —roughly corresponding to one human generation, before the desired level of upgrading is accomplished. Hence, while some qualitative improvements can be expected to show up even during the period of investment, the increase in output of livestock products may not be significantly large. Investment on other heads such as setting up of creameries and composite milk plants are quick-maturing and their contribution to the livestock output would be realized soon after the investment is made, but it is difficult to work it out precisely. The outlay on poultry farming would likewise yield incomes directly and with relatively less time-lag but they would be largely in the nature of supplementary incomes to agriculturists and would tend to facilitate mixed farming. The income effect of investment on veterinary clinics is indirect and slow in materializing. Its contribution would be through the improvement in the health of livestock.

3.30 By and large, the pattern of investment suggested for livestock development is such that additions to output would be secured through improvements in livestock quality, which is essentially a long term process, rather than by measures yielding direct and immediate return.

3.31 The impact of the proposed programme on employment would also be mostly indirect. It would not create many new jobs except to some extent for technical personnel such as veterinary doctors, stockmen, etc. It would enable the agriculturists to utilize some of their idle time profitably by engaging in mixed farming and to that extent would tend to reduce under-employment in the rural areas.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

Chapter 4

Forests

ORISSA HAS 25,000 square miles of forests, covering 42 per cent of the geographical area of the State and 8 per cent of the total forest area of the country. The State has nearly 10 per cent of its area more under forests than was laid down as optimum in the National Forest Policy while the country as a whole has about 12 per cent less.

4.2 A net income of about Rs. 5 crores[1] was generated by forests in 1956-57. This formed a higher proportion (1·6%) of the State income (0·7%). On the other hand, employment in forests which according to the Census of 1951 was roughly 22,000 persons or 0·4 per cent of the total working force in the State, was equal to the corresponding proportion for India as a whole. The revenue collected by the Forest Department during the fiscal year 1956-57 was Rs. 1·89 crores or about 11 per cent of the State's total revenue. In 1959-60, forest revenue rose to Rs. 3·13 crores forming over 10 per cent of State revenue. Madhya Pradesh is the only other State in the country where the revenue from forests formed a larger proportion (12%) of the State's total revenue. However, the per acre revenue from forests is only Rs. 1·70 in Orissa which is very low compared to other States like Kerala where the revenue is five to six times higher.

Types of Forests

4.3 The total forest area of the State is divided between different categories of forest as below:

		Area (Sq. miles)
(*i*) Reserved forests		8,681
(*a*) 'A' Class	7,961	
(*b*) 'B' Class	720	
(*ii*) Reserved lands		963
(*iii*) Demarcated protected forests		208
(*iv*) Undemarcated protected forests, unreserved lands, unreserved and khesra forests including unclassed forests		7,660
(*v*) Ex-zamindari forests[a]		7,774
(*vi*) Private forests		72
TOTAL		25,358

[a] The bulk of the ex-zamindari forests have not yet been legally constituted as forests.

---

[1] NCAER Estimates of State Income.

4.4 Of the six categories of forests described above, categories (*iv*), (*v*) and (*vi*) have very little productive value. Large tracts in these types of forests are barren or subject to shifting cultivation. If such tracts are excluded, the area covered by commercially valuable forests would not amount to more than 15,000 square miles or 25 per cent of the total geographical area of the State.

Regional Distribution

4.5 The distribution of the forests within the State is rather erratic. Where the density of population is high as in the coastal districts and the plains region, comprising Mayurbhanj, Dhenkanal, Sundargarh, Sambalpur, Bolangir and Kalahandi districts, forests are generally degraded and the area covered by them can be best described as waste land. This is true also of those areas (parts of Koraput, Ganjam and Phulbani districts) where shifting cultivation is prevalent. The bulk of the commercially valuable forest in the State is thus located either in the hilly regions of the northern plateau or in the eastern ghats.

Extraction and Utilization of Wood

4.6 Forests in Orissa contain a large number of wood species. Many of these are at present regarded as non-commercial, and suitable, at best, for firewood or charcoal. Of the commercially valuable wood species, Sal (*Shores robusta*), Asan (*Terminalia tomentosa*) and Bija (*Pterocarpus marsupium*) are the most important. The annual average of the volume of commercial timber cut during the period 1955–58 is shown below:

ANNUAL AVERAGE OUTPUT OF TIMBER CUT IN THE RESERVED FORESTS OF ORISSA FOR THE PERIOD 1955–58

	Volume cut (Thousand *ft.*)
Sal	7,651
Asan	1,772
Bija	622
Teak	40
Others	7,648
TOTAL	17,733

SOURCE: Forest Department, Government of Orissa.

4.7 Of the 17·7 million cu. ft. of timber cut, approximately 65 per cent was Sal, 15 per cent Asan, 5 per cent Bija and the remaining 15 per cent consisted of 20 different species. About 40 per cent of the timber outturn was exported outside the State.

4.8 The actual volume of firewood removed from the forests is not known. It is estimated that roughly 103 million cu. ft. are consumed in the State, including three million cu. ft. which

GSL

is carbonized to make about 30,000 tons of charcoal. The utilization pattern of the wood cut from forests in the State is indicated below:

ANNUAL OUTTURN OF TIMBER AND FIREWOOD IN ORISSA (AVERAGE FOR 1955–58)
(Million cu. ft.)

Timber		*Firewood*	
Output	*17·7*	*Output*	*103·6*
Non-commercial timber	5·6	Manufacture of charcoal	3·0
Export (commercial timber)	7·4	Export	0·6
Available for consumption as timber in the State	4·7	Available for consumption in the State	100·0
Total volume of wood available annually in the State		121·3 million cu. ft.	
Volume of wood consumed in the State		113·3 million cu. ft.	

4.9 On the basis of available information, it is not possible to relate the present yield of forests to the maximum outturn possible from existing forests. However, if we take roughly 13,000 square miles of forest area in the State as commercially valuable, the annual yield of wood would be 265 million cu. ft. On the basis of an acre of forest containing 2,000 cu. ft. and with a 75-year rotation period adopted for cutting, this is over 50 per cent higher than the actual yield. Apparently, the principal reason for the relatively low rate of extraction is the lack of transport facilities in many areas, and particularly in Bonai, Kalahandi, Koraput, Phulbani and Keonjhar districts where many areas are not even opened up for want of roads.

Bamboo

4.10 Besides timber and firewood, bamboo is an important forest product. Roughly 2,455 square miles of the forest area in Orissa is covered with bamboos. The current annual output is about 180,000 air dry tons, of which 40,000 air dry tons are consumed by the Orient Paper Mills at Brajrajnagar, 80,000 air dry tons by paper mills in West Bengal and 60,000 air dry tons by villagers. According to a survey conducted by the Forest Department, bamboo forests in Orissa can yield 435,000 air dry tons annually after meeting the local demand or 315,000 air dry tons more than the present output. An estimate made by the National Council indicates that the potential yield of the existing bamboo forests in the State could be taken at 750,000 to 800,000 air dry tons per year.[1] This would mean that approximately 600,000 tons of air dry bamboos could be made available annually over and above the present supplies in the State for industrial purposes.

---

[1] The average per acre yield of *dendrocalamus strictus* for India as a whole verified against the experience in Andhra Pradesh is between half and three-fourths air dry tons. This indicates that with proper silviculture practices, it should, at least, be the same in Orissa also. A fact that lends further support to this conclusion is that the development of this variety of bamboo is better in Orissa and that the better yielding variety of *bambusa arundinacea* also occurs. Thus even at a conservative average annual yield of half air dry ton per acre, 2,455 square miles of bamboo forests in the State should yield 785,600 air dry tons.

Minor Forest Produce

4.11 Forests yield a variety of minor products. Kendu leaves used in the manufacture of *bidis* are the most important minor forest produce and account for about 70 per cent of the revenue obtained. Besides bamboo, which is considered a minor product, others which are of importance are broom grass, *sabai* grass, *karava* gum and lac. The total revenue produced by these products in 1956-57 was about Rs. 53 lakhs.

Forest-based Industries

4.12 The most important industry based on forest resources in the State is paper. There is one paper mill at Brajrajnagar with a capacity of 45,000 tons per year. There are plans for expanding the capacity of this mill to 67,000 tons per year and in addition two new plants of 18,000 tons capacity each are contemplated for erection—one near Rayagada and the other in Cuttack. This expansion of capacity would require an additional output of 145,000 tons of air dry bamboo.[1] Assuming that the export to Calcutta would remain constant, the total bamboo output by 1961 would be about 245,000 air dry tons. Taking the potential at 750,000 to 800,000 air dry tons, there will be a surplus of about 500,000 tons which could be utilized for further expansion of paper industry.

4.13 Timber-based industries in Orissa are still in the early stages of development. The State annually produces about two million tons of sawn timber (including sleepers). There are 73 saw mills located in the vicinity of Berhampur, Cuttack and Brajrajnagar. All of these mills are small. Strictly speaking, Orissa has no woodworking industry; it has a number of cottage-type furniture and boat-building units.

FUTURE DEVELOPMENT

4.14 It is evident that as against the large forest potential of the State, the development of forest-based industries is inadequate. This discrepancy arises principally from the two significant features of Orissa forests pointed out earlier, viz., the large proportion (40–50%) of the forest area which is currently considered of little commercial value and the relatively low rate of extraction. Besides, backward methods of logging contribute their share to the relatively low output of Orissa forests. For the development of forest resources of the State, therefore, measures have to be directed towards removing each of these drawbacks.

Survey of Forest Area

4.15 However, before any positive measures could be adopted, certain amount of preparatory work would have to be done. One of the chief difficulties in the way of assessing the forest potential of the State accurately is lack of information. It is essential that a detailed survey of the entire forest area should be made and an inventory of the existing forest resources taken. Only after this has been done it would be possible to know the extent to which forest output can be increased and the areas from which it can be obtained.

4.16 In addition to making an inventory of forest resources, it is also necessary to identify areas specifically suited (from the point of climate and soil conditions) for certain commercially valuable species. This type of detailed evaluation of the forest area would be particularly useful for that part of the forest which is at present covered with miscellaneous growth and also for areas which were included in the former Zamindaris and Indian States and were recently acquired. The purpose of doing this is to provide the basis for a long term afforestation programme which aims at maximizing forest output in the given ecological conditions. Once a programme of this type has been drawn up, it can become the basis of planning the development of forest-based industries.

---

[1] Assuming that one ton of paper requires 2·5 tons of air dry bamboo.

Working Plans

4.17 With an inventory of the existing forest resources and a map of the forest area showing the species suitable for growing in different areas, it would be possible to draw up better working plans. This needs to be done as early as possible, since 12 out of 29 forest divisions in the State in 1958 had no working plans and in the remaining 17 divisions, working plans were due to expire soon.

Afforestation

4.18 To increase the area of "stable" productive forests in the State a large scale programme of afforestation is required. The chief consideration on which such a programme should be based is the suitability of a species to the area proposed to be planted. Where the species suitable are more than one, weight should be given to those which mature earlier. In drawing up this programme, the survey suggested earlier would naturally be of great value. However, on the basis of existing information the species suitable for different broad regions of the forest area in the State can be indicated.

4.19 Casuarina, cashew and eucalyptus (hybrid)—all relatively quick maturing species are suitable for growing in the coastal region where the sub-soil water level is high. Of these, cashew is also suitable for growing in hinterland in bare, denuded areas. Where a choice is possible between these three species, cashew and eucalyptus (hybrid) are preferable. In their case the second rotation crop comes up without any additional expenditure while casuarina requires replanting after every rotation. In the moist sal and teak zones these species should be regenerated. Dry sal areas are usually suited for teak. These areas in the State should be gradually converted into high quality teak plantations.[1] Areas which now have miscellaneous tree growth should be converted into sal or teak forests depending on edaphic factors. In the distribution of species over the forest area the change visualized is mainly in the development of teak and the fast maturing species such as eucalyptus (hybrid), cashew and casuarina. Sal, which at present contributes the largest share to forest output, is to continue to be the most important species in the moist sal zone where it is to be regenerated.

4.20 In addition to these major species, relatively small plantations of such species as sissoo, *semul*, wattle, etc., should also be developed and located in areas where their growth is likely to be best.

4.21 On these broad lines, a programme for afforestation covering approximately 450,000 acres should be undertaken during the next 10 years. Of this, one-third may be undertaken in the Third Plan and the remaining in the Fourth Plan. The area to be covered in the Third Plan would broadly conform to the target proposed by the Forest Department.[1] The investment for a programme of this magnitude is estimated roughly at Rs. 4 crores.

---

[1] It might be pointed out that the development of artificial teak plantations in the State has been remarkable and clearly suggests that such plantations should have excellent prospects in the State.

4.22 During the Second Plan period, the State had a plantation target of 19,853 acres involving a cost of Rs. 12·13 lakhs. Compared with this, the programme suggested for the Third and Fourth Plans seems ambitious. However, it is justified if the large forest potential of the State is to be developed. It must be pointed out that even with this programme, only 7 per cent of the forest area which is now regarded as unproductive would be covered. At this rate, it would take over 130 years to cover the entire area. Clearly, it is necessary to accelerate the rate at which plantation is undertaken.

4.23 For a plantation programme of the magnitude suggested here, a large number of technically trained personnel would be required. On account of the shortage of personnel, it is suggested that, as far as possible, plantation should get preference over minor forest extension schemes, such as rehabilitation of village forests or planting of trees along roads or canals or *nature* conservation, which could be staggered over a much longer period of time. In addition to this, a systematic training programme should also be developed.

Rate of Extraction

4.24 The second major requirement for increasing the forest output is to step up the rate of extraction. This can be done by improving transport facilities, settling *podu*[2] cultivators and improving felling methods.

Roads

4.25 At present there are approximately 2,775 miles of forest roads in Orissa. In relation to the forest area of the State, this road mileage is very inadequate; it provides only 0·1 mile of road per sq. mile of forest area. Road mileage in relation to forest area varies from region to region. In Deogarh forest division, for example, there is only 0·034 mile of road to a square mile of forest area as against 0·26 mile in Angul forest division. Furthermore there are several regions which are inaccessible and consequently have not yet been opened up. These regions are to be found mostly in Bonai, Kalahandi, Koraput, Phulbani, and Keonjhar districts. The State Forest Department has set for itself the standard of one mile of road to one square mile of forest area to be achieved over successive Plan periods. The contemplated target for the Third Plan is to construct 850 miles of new roads and improve another 400 miles of existing roads. The proposed new construction would increase the road mileage per square mile of forest area from 0·1 to 0·14 in five years. This is indeed a modest rate of progress in relation to the norm to be achieved. It is suggested that the target for the Third Plan should be raised to about 2,500 miles and a target of 5,000 miles should be set for the Fourth Plan. This increase in road mileage would provide about 0·4 mile of roads to a square mile of forest area in 1971. The cost of constructing 7,500 miles of roads between 1961 and 1971 would be approximately Rs. 3 crores. In addition, about Rs. 1 crore should be spent on improving the roads during this period.

---

[1] According to the Scheme prepared by the Forest Department, an area of 129,000 acres is proposed to be planted during the Third Plan. A provision of Rs. 78 lakhs has been made for economic plantation and another Rs. 21 lakhs for rehabilitation of the degraded forests and waste lands.

[2] *Podu* or shifting cultivation is a system of agriculture in which a forest area is burnt down to cultivate the land. After a few years this land is abandoned, another forest patch is selected for the same purpose. In this manner, the cultivators keep shifting from one area to another.

4.26 According to the proposals of the Forest Department new roads are to be constructed in Baripada (Koraput) circle (489 miles), Sambalpur (406 miles) and Berhampur (617 miles). These road developments are intended to open up new areas as well as to serve growing forest-based industries. Important existing locations of forest-based industries are Sambalpur-Brajrajnagar area, Cuttack and Berhampur-Aska area. Of these, the first two are more important. A considerable part of timber utilized in industries in Cuttack is floated down the Mahanadi. For the new paper plant now proposed to be established in Cuttack, bamboo will be moved to the mill in this fashion. The need for roads in the other two areas is, therefore, relatively greater. On the basis of the bamboo resources of Ganjam and Koraput districts a paper mill is now under construction near Rayagada. This locality is rich in forest potential and can become an important new centre for the development of forest-based industry. Considering that this region lacks in other resources for industrial development and is, at present, poorly served by transport facilities, high priority should be given to road construction to develop and exploit its forest resources.

Shifting Cultivation

4.27 Shifting cultivation is a serious hindrance both in the way of exploitation of existing forest and development of forest resources. It was estimated that as much as 12,000 square miles or roughly one-fifth of the area of the State was affected by this system of cultivation involving a million of *podu* cultivators. On account of the wasteful nature of this form of cultivation and the large area affected by it, the Government has been seriously considering the means to reduce its incidence. Two Committees—the Partially Excluded Area Committee and the Forest Enquiry Committee—have already gone into the question and made a series of recommendations.

4.28 The reclamation of land, subject to shifting cultivation consists largely in settling the *podu* cultivators into the practice of permanent agriculture. The only logical approach to achieve this end seems to be to prove to the *podu* cultivators through demonstration farms the superiority of permanent agriculture as a means of livelihood and to provide the necessary conditions in which settled agriculture can be practised profitably by them.

4.29 For the purpose of settling these cultivators, areas should be carefully selected so that adequate water sources and transport facilities are available. The cropping pattern of the settlement should be mixed, having fruits and vegetables (or pepper and coffee) if possible as a significant component. In addition, mixed farming should be encouraged with special emphasis on poultry. A block of forests should also be attached to every settlement, from which the settlers should be free to gather minor forest produce on payment of a nominal sum. It would be more practical at least in the initial stages, for the Government to undertake the responsibility of terracing the land intended for a settlement and to implement other soil conservation measures.

4.30 The major part of the process of getting *podu* cultivators to settle down is to convince them that the change is for the better. It must be remembered that demonstration farms by themselves may not produce the desired result. Though the tribal people engaged in shifting cultivation have in most cases come in contact with permanent cultivation and may even be aware of its advantage, the system is basically alien to them and there is a built-in social resistance. To overcome this resistance it might be useful to impart them a sense of participation in the demonstration farms by employing them as hired labourers, and more significantly, by associating their social leaders with the organization of the farms.

4.31 In some areas, such as Ganjam district, it has been found that after *podu* cultivation miscellaneous forests turn to almost pure sal jungle. This at any rate is the case in wet areas where *podu* cultivation is permitted so that the lessee may raise a pure sal crop. Such miscellaneous forests should be stock mapped[1] and shifting cultivation utilized to raise sal plantations.

Techniques of Working

4.32 In choosing the techniques for working the forests, the objective should be to increase the current yield as well as to promote afforestation so that the full potential of each type of forest area is realized. With this end in view it is suggested that forest areas in the State which can be worked under concentrated methods such as clear felling, should be treated accordingly. The rest of the forest area should be worked under selection felling, except forests which occur on steep terrain or are required for conserving soil and moisture.

Bamboo Regrowth and Problem of Waste

4.33 Bamboo is an important industrial raw material. It is found that while the paper mills which work the bamboo forest themselves adopt efficient methods of felling, they are not as careful to minimize waste. Thus the top ends of the culm and the side switches are usually left in the forest. Apart from being a waste, this practice is dangerous because it increases fire-hazard. It is suggested that simple portable manually worked crushers (for smaller bamboo material) and choppers (for larger pieces) worked with power from lorry engines should be utilized at the forest site to make the transport of this bamboo material economical.

4.34 In addition to this, specific regeneration and other problems should receive immediate attention. There are several such problems facing different forest regions of the State. They are, for example, mortality of casuarina at Balukhand, regeneration of coastal sal and invasion of sabai grass plantations by indigenous grasses.[2]

4.35 Roughly 80 per cent of the species occurring in the State are regarded useful only as firewood. These species have unsatisfactory physical properties. They cannot be easily air-seasoned because they crack or warp. Without seasoning they are easily attacked by fungus or termites. On account of this physical shortcoming, these species are not utilized as timber. No attempt has been made to apply advanced methods of wood seasoning and wood preservation to upgrade these species for utilization as timber. Although accurate information regarding the quantity of these species in the forests of Orissa is not available, it is certain that the output of timber could be increased considerably if these species were treated to remove their physical imperfection. As initiative in this matter is not likely to come from the private owners of saw mills it is recommended that the State Government should set up a seasoning kiln and wood preservation plant in the Government-owned saw mill at Rourkela. It should also finance an educational campaign to convince the consumers of timber as well as owners of saw mills of the advantages of using proper seasoning and preservation techniques.

---

[1] Stock mapping consists of a survey of a region with a view to locating the various species already growing and the species likely to grow successfully.

[2] Detailed suggestions regarding the ways of tackling these and other problems are incorporated in the NCAER Appraisal Report on Orissa Forests.

4.36 Although improved logging methods do not directly increase the timber output, they are an important step in linking forest produce with its industrial utilization. It is suggested that a techno-economic study should be made to investigate the possibility of using improved hand tools—axes and saws—for felling purposes and portable log-breakdown mills for producing sleepers and other large diameter lumber. Improved tools and better techniques would help in bringing down the production cost of timber and would thus encourage timber-based industries.

Growth of Forest Output, 1961–71

4.37 If the area suggested for afforestation is planted during the decade 1961–71 and other developments recommended are brought about, it is estimated that the net value of forest output would increase from approximately Rs. 6·97 crores in 1961[1] to about Rs. 13·5 crores in 1971 or by 94 per cent. Of the additional net product, approximately Rs. 1·75 crores would be generated from the existing forests and the remaining Rs. 4·8 crores from the yield of new plantations created during 1961–71.[2] For this rate of growth, the investment requirement for the decade 1961–71, is estimated at Rs. 16 crores of which Rs. 4 crores would be on afforestation, Rs. 3·5 crores on improvement of communications and the remaining Rs. 8·5 crores on other items, such as surveying and drawing up of working plans, training and research, buildings, extension forestry,[3] nature conservation, rehabilitation and labour amenities. Further, it is estimated that the suggested programme for development would create full time employment for 1,500 skilled workers and technical personnel of various categories[4] and seasonal employment for over 0·5 million unskilled workers.[5]

---

[1] NCAER Estimates (at 1956-57 prices), *vide* Table 86.

[2] Earlier in the chapter it was indicated that the existing forest resources of the State might be under-exploited to the extent of about 50 per cent of the optimal output. The ways of increasing the output from existing forests have been suggested in this chapter. On the assumption that these suggestions are implemented it is expected that during the ten-year period 1961–71 at least half of the unexploited capacity would be utilized. At constant prices this would yield a net output of Rs. 1·75 crores. The revenue from the afforestation schemes undertaken during the Third Plan will begin to accrue by the fourth year of the Plan and will increase progressively after that. In 1964, it is expected to be Rs. 632, in 1971 Rs. 48 lakhs and in 1978 Rs. 2·23 crores. On the assumption that the net value of the produce is 10 times the revenue it will be Rs. 6,320 in 1964, Rs. 4.8 crores in 1971 and Rs. 22.3 crores in 1978.

[3] Since extension forestry is almost as costly as afforestation and not as productive in the short run, it is more economical considering the limited funds and technical personnel available to concentrate on afforestation programmes and spend a relatively small amount on extension forestry (specially roadside and canalside plantations) over the next ten years.

[4] Details worked out for the Third Plan period are given in Table 18.

[5] Employment of 46·4 million man-days is taken to be spread over a period of three months.

Chapter 5

Fisheries

ORISSA HAS A 250 mile-long coast line which is covered in many parts by river mouths and estuaries. Inland, there are about 600 square miles of rivers and streams besides large ponds, tanks and reclaimed swamps. On an average, the State produces a total of 23,000 to 25,000 tons of fish per year, of which about a third is sea-fish and the remainder estuarine and fresh water fish from all the inland sources.

5.2 Only two-thirds of the State's population are reported to be fish eaters. Even so, the fish consumption levels are very low. The per capita (annual) availability of fish for the fish-eating population was 5·3 lbs. in Orissa as against 9·5 lbs. in the country as a whole. In some of the other maritime States, fish consumption was still higher; in Kerala, for example, it was six times as much as in Orissa. The low level of fish consumption was partly on account of a net export of fish from the State.

5.3 According to population census of 1951, fishing provided principal source of livelihood to 44,000 persons or 0·8 per cent of the total working force of Orissa. The corresponding proportion in all-India being only 0·4 per cent, fisheries sector was relatively more important as a source of employment in Orissa.

5.4 Fisheries contributed roughly Rs. 1·76 crores to the State income in 1956-57. As a source of income, this sector was of equal importance in Orissa and the country as a whole, contributing 0·5 per cent to the total net output.

5.5 Considering that Orissa is a maritime State, the share of fisheries in the State income is low. This is due to the fact that the fish resources of Orissa are not adequately exploited compared to other maritime States. During the Second Plan period, the output of fish was proposed to be increased by about 1,000 tons or by 4 to 5 per cent and the net value of output by approximately Rs. 10 lakhs. Concentration of effort on development of culture fisheries and research which produce results over a longer period of time is perhaps the major cause of this rather slow rate of increase.

5.6 There are hardly any fish-based industries in the State. The only industry of any consequence is fish curing, but the product is generally of a poor quality. A small amount of medicinal shark liver oil is also produced.

MARINE FISHING

Coastal Fishing

5.7 Coastal fishing is confined to a narrow belt of three to four miles over a relatively short stretch of the coast. In this belt, there are 115 fishing villages concentrated in Pattisonapur, Markandi, Gopalpur, Paryagi, Purnnabandhu, Damodarpur, Rambha, Chanmubani, Arkhakuda, and Puri tehsils which are also the important centres of production.

5.8 As is clear from Table 19, the catch of fish per fishing craft as well as per fisherman is very much lower in marine fisheries in Orissa than in all-India. Since the (marine) fish resources along the Orissa coast are fairly rich, low catch may largely be attributed to backward and inefficient fishing methods.

5.9 According to an estimate by the State Fisheries Department, on an average, two-thirds of the catch is sun-dried or cured. Fresh as well as dried fish is exported, mostly to Calcutta, Kharagpur and Tatanagar. On the basis of data collected from railways, it is estimated that roughly 3,600 tons of fresh marine fish and 27 tons of marine dried fish were exported from Orissa in 1957-58. The export figure for dried fish is undoubtedly an under-estimate as it excludes export by road and water. However, this is likely to be very small.

5.10 On account of lack of proper berthing, landing and other harbour facilities, no off-shore fishing has developed in the State.

5.11 Orissa has considerable potentialities for the development of marine fisheries. Trawlers of the Government of West Bengal, operating off the coast of Orissa have been making an average landing of five tons of fish per fishing day per trawler, which is regarded as a good catch. The composition of the catch as recorded by the Government of West Bengal is roughly 30·6 per cent, of readily marketable quality or 'A' class fish such as, pomfrets, prawns, perches (specially *Lates calcarifer*), bigger sized Sciandis and Grangonids; 66·9 per cent of second quality or 'B' class fish such as, smaller Sciandis, glass fish, Clupeids, Polynemids, Bombay Ducks and smaller-sized perches; and 2·5 per cent of coarse or 'C' class fish such as sharks, rays, skates and cat-fish. The data collected by the Central Marine Fisheries Research Station of the Union Ministry of Food and Agriculture over a period of years regarding the composition of landings of fish on the Orissa coast also give a similar breakdown.[1] It is clear from this that Orissa coastal waters are well stocked with different types of fish.

5.12 However, current exploitation of this resource is poor in terms of total landings as well as catch per fisherman. To step up both, it is recommended that 100 mechanized boats, 30 to 35 feet in length, 4 to 5 feet draft, using 30 to 40 HP engines and well equipped with fishing gear should be employed. Assuming a conservative annual catch of 60 tons per boat,[2] these boats would lead to an additional output of 6,000 tons of fish per year valued at Rs. 21·3 lakhs.[3] The total capital cost for the 100 boats is estimated at Rs. 35 to 40 lakhs and the total operational cost (including depreciation) at Rs. 15,000 per year, per boat.

5.13 A major bottleneck to coastal fishing with mechanized boats in Orissa is the lack of proper harbour facilities. The development of these facilities should be seriously considered. Some locations that deserve close examination are: Chandbali, Mayapura, Paradip, Machgaon, Puri, Kutanikuti, Gopalpur, Sonapur, Rusikulya and some places on the sea-ward side of the Chilka lake. In recommending the introduction of mechanized boats this deficiency has been taken into account and their number has been limited by the facilities that either exist or can be easily provided. Undoubtedly it would be possible to use a large number of bigger boats if proper harbour facilities were developed in suitable location along the coast.

---

[1] It is interesting to note that during the three years 1956, 1957 and 1958 the landings of "prawns and other crustaceans" constituted as much as 20 per cent and of sharks and rays about 2 per cent.

[2] Assuming 100 fishing days in the year.

[3] For estimating the composition of catch, it is assumed that 'A' class fish would constitute 25 per cent, 'B' class 60 per cent and 'C' class 15 per cent. After taking into account the price of ice and the handling charges, transport and marketing charges, the wholesale price at site of production is taken at Rs. 700 per ton of 'A' class fish, Rs. 500 per ton of 'B' class fish and Rs. 100 per ton of the remaining 'B' and 'C' class fish.

5.14 It is suggested that of the 100 mechanized boats to be introduced during the Third Plan period, 30 to 40 should be based at Paradip, which is being developed as an all-weather port suitable for vessels of large tonnage; 20 to 25 at Chandbali and 10 to 12 each at four selected centres. It is to be emphasized that the transport facilities, especially road-links between these centres and the fish markets in the State would have to be improved. In this connection, it may be stressed that high priority should be given to the extension of the existing road between Cuttack and Kujong to Paradip.

5.15 In addition to transport links, it would be necessary to provide each of these centres with the requisite shore installations such as, diesel oil depots, ice and cold storage plants, manufacturing units for shark liver oil and fish meal, fish curing yards, workshops and insulated road vans. Each of these centres should be planned to become an Integrated Development Centre.

5.16 It is considered advisable that the mechanized boats should be owned and operated by fishermen preferably organized into cooperatives. Following the practice in other maritime States, cooperatives or groups of fishermen may be aided by subsidies and/or loans on easy conditions, to partially cover the cost of acquiring a mechanized boat. However, if it is found that private parties are not coming forth to buy the boats, the Fisheries Department of the Government should acquire and operate them to demonstrate to the fishermen their working and economies.

5.17 The output from the existing indigenous fishing operations in the sea can also be increased by providing the fishermen with adequate quantities of yarn, sail cloth, fishing boats and other production requisites and by improving their nets and other gear. Among these, nylon nets which are known to increase the catch considerably may be specially emphasized.[1] With improvements on these lines, it is estimated that the annual catch from indigenous operations can be increased by 2,000 to 3,000 tons.

5.18 The experience of Calcutta-based trawlers has clearly shown that there are rich fishing grounds in the sea off the coast of Orissa. It would be even more profitable if trawlers are operated from Orissa ports since the time taken to reach and return from the fishing grounds would be comparatively much less. The chief difficulty in the way of introducing off-shore fishing in Orissa has been the lack of proper berthing and harbour facilities and there is no doubt that any development on a large scale would have to be delayed until Paradip harbour and the requisite facilities in Chandbali and some other ports are developed.

5.19 However, even with the existing facilities at Paradip, Chandbali and a few other places, boats with a draft of 5 to 6 feet can be easily operated. It is suggested that by the end of the Third Plan, about 30 well-equipped boats, 50 to 60 feet in length, 5 feet draft and using 80 to 100 HP engines should be based at six centres. It is estimated that the capital cost of each boat would be Rs. 1 lakh and the working expenses Rs. 40,000.

5.20 If the boats are properly equipped and provided with insulated holds, they could easily work for at least 150 days in the year. Although it would not be difficult to achieve a two-ton per day yield, it may be assumed that for the first few years, the annual yield would be about 175 tons per boat. The addition to fish output in the State that can be expected from off-shore fishing can be thus taken at 5,000 tons per year valued at Rs. 15 lakhs.[1]

---

[1] At present nylon filament and twine are largely imported from abroad and their availability is greatly restricted by foreign exchange difficulty. Under these circumstances, serious consideration should be given to their manufacture in India.

5.21 On account of the larger capital investment required and higher working expenses, it may not be possible for groups of fishermen or cooperatives to undertake off-shore fishing. The State Government should encourage private companies to enter this field. Immediately, however, it may be necessary for the Fisheries Department to start operations on their own.

Estuarine Fishing

5.22 There are several estuaries in Orissa. Of these Chilka lake is by far the most important. However, on account of its peculiar characteristics, it is usually treated separately. There are three other important estuaries: the Mahanadi, the Dharma and the Subarnarekha.

5.23 The total estuarine area (excluding Chilka lake) in the State is 1,150 square miles and of estuarine swamps 20,000 acres. The average annual catch from these estuarine fisheries is estimated at 5,000 tons.[2] In normal years *hilsa* forms the bulk of the catch. However, during the last couple of years, landings of this fish have been negligible and the bulk has been formed of quality fish and other fish, such as *bhetki*, mullets and polymemids, engraulids and cat-fish. According to the Central Inland Fisheries Research Station, there are indications that *hilsa* fishing may revive from this year.

5.24 Between 70 to 80 per cent of the fish from the Mahanadi estuary and nearly all from the Dharma and the Subarnarekha estuaries is cured. Some of the fresh fish from the Mahanadi estuary is exported from Kujang which is an important fishing and assembly centre, but nearly all the fish from the other two estuaries where fishing is in a very backward condition is consumed within the State.

5.25 The Chilka is a pear-shaped lagoon about 40 miles long and on an average 12 miles broad in the north and about five miles in the south. It is situated in Puri and Ganjam districts. Fed by fresh as well as saline water, the lake has both fresh water and marine fish. However, its richness as a fishery depends largely on its sea connection.

5.26 There are about 114 villages around the lake or on islands in the lake; most of them are fishermen's villages. About 8,000 fishermen are actually engaged in fishing and employ 2,350 large and small boats.

5.27 The Chilka lake fisheries are highly productive and the catch per acre of water compares favourably with similar lakes in other parts of the world. The average annual catch for the ten years, 1948–57, was 95,307 maunds and in 1958 it was 102,827 maunds. Among the commercially important species landed, prawns form the largest share (30%), followed by mullets (21%), cat-fishes (16·4%) and clupceids (10·5%).

5.28 Most of the Chilka lake fish is exported fresh, principally to Calcutta. The average annual export for the years 1951–57 is estimated to be of the order of 80,000 to 85,000 maunds or about 85 per cent of the total catch. There are several assembly centres, where fishermen bring their catch to sell to either cooperatives or merchants who in turn sell it in the Calcutta market through *adatdars* (commission agents). The price of fish paid to fishermen in the Chilka area is thus largely governed by the wholesale price in Calcutta. Normally, the price at which

---

[1] Assuming a similar composition of catch and price levels as indicated on page 44.

[2] Except for the Mahanadi estuary, hardly any data are available for other estuaries.

GL

the fishermen sell in the Chilka area is half the price paid by the consumer in Calcutta, the difference being the charges for handling, transport and the services of a series of middlemen.

5.29 The present fish production in Chilka lake is considered adequate and it may not be safe to increase it appreciably without running the possible risk of depleting the resources.

5.30 The mechanized boats suggested for coastal fishing would also operate in the estuaries and would substantially increase the output from these fisheries. In addition, a gradual switch-over to nylon nets and other improvements in gear and the use of carrier launches for collecting fish from the production areas to a few large assembly centres would improve the yield of existing operations. Through these measures which are estimated to cost about Rs. 15 lakhs it should be possible to increase the output of estuarine fisheries by about 3,000 tons per year.

Riverine Fisheries

5.31 There are several rivers in Orissa, covering approximately 600 square miles of area. Of these, the Mahanadi and the Subarnarekha are the most productive in fish yield. They are also the chief source of fish seeds used for fish culture in ponds, reclaimed swamps, etc.

5.32 No information is available regarding the number of fishermen engaged in riverine fishing. However, according to a rough estimate, 2,500 fishermen are engaged in fishing in the Mahanadi alone. The total annual output of riverine fisheries is estimated by the Fisheries Department of the State Government at 2,000 tons, but in the opinion of the NCAER's experts, this understates the actual magnitude of the output.

5.33 Riverine fisheries are the chief source of local supply of fish, most of it being consumed in the fresh state. However, the price of fish in the local market is high. The wholesale price of the good varieties (large carps and some cat-fish) is Rs. 65 to Rs. 100 per maund and of small varieties Rs. 30 to Rs. 50. The development of riverine fishing needs bringing about improvements in transport and marketing facilities. If this were done, as indicated later, it would be possible to increase the output by two to three thousand tons per year.

Reservoir and Culture Fisheries

5.34 The Hirakud and other reservoirs in the State are a potentially rich source of fish. Of the total reservoir area of approximately 400 square miles, "sample stocking" is being done in 288 square miles. Fishing in the Hirakud reservoir with three small mechanized boats has recently commenced and the output is reported at a ton per day.

5.35 There is an area of more than 50,000 acres of reclaimable swamps in the State. The State Fisheries Department has so far reclaimed 1,064 acres and is stocking them with fingerlings from spawn collected from rivers and canals. In addition, a large number of ponds and tanks are also being stocked.

5.36 Production from culture fisheries is estimated by the State Fisheries Department at 6,000 tons per year. In the opinion of the NCAER's experts, this is probably an under-estimate. Culture fisheries are scattered all over the State and their output is consumed locally.

5.37 According to an estimate made by the Union Ministry of Food and Agriculture, there are about 200,000 active fishermen scattered all over the State. They are mostly farmers who engage in fishing as a part-time occupation. There are definite indications to show that fish farming is on the increase in Orissa and it is believed that more and more farmers are finding

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

that they can get a better return by utilizing their time in rearing fish in small tanks than in cultivating paddy. Even at a low per acre fish yield of 500 lbs. for the State (the average per acre yield in many States in India is estimated at 1,000 lbs.) the gross receipts from the output of an acre amount to Rs. 400 to Rs. 450 and the net receipts, after allowing for the cost of production and fingerlings, to Rs. 200. This compares very favourably with the average value of less than Rs. 150 currently yielded by an acre of paddy cultivation.

5.38 The State has a large number of ponds, tanks and swamps which can be utilized for fish culture. Considering the remarkable progress made so far in the reclamation of swamps and techniques of fish culture, it should not be difficult to bring under fish cultivation an additional water area of 30,000 acres during the Third Plan period. On a rough estimate this would yield 6,000 to 7,000 tons of fish per year[1] and will involve a capital cost of Rs. 1·5 crores[2] and a recurring cost of Rs. 60 to Rs. 65 lakhs for stocking and increasing the supply of fish seed. Besides, with continued stocking of Hirakud and other reservoirs, the output from this source can be increased by 1,000 tons per year.

5.39 In 1958, the State Fisheries Department supplied 12·5 million of fry and fingerlings for stocking. In order to stock 30,000 acres of additional water area, the supply of fry and fingerlings will have to be increased to 50 to 70 million per year. Rivers will, no doubt, continue to be a major source of supply, but increasingly greater reliance will have to be placed on supplies obtained by induced breeding of Indian carps and by the introduction of exotic carps that can be made to breed under certain conditions throughout the year. Experimental work already carried out holds great promise of making almost unlimited supplies of fish seed available for the expansion of culture fisheries.

5.40 The price of fresh water fish is very high in Orissa. The wholesale price of large carps in Cuttack varies between Rs. 80 to Rs. 100 per maund and of smaller and inferior varieties between Rs. 40 to Rs. 60 per maund. The high price is directly attributed to the inadequate supply of fish as compared to the existing demand not only in the State itself but also in the neighbouring markets of Calcutta, Tatanagar, Kharagpur and Asansol. Whether increased output as envisaged in this report would result in a lower price level cannot be predicted, because substantial increase in demand in the State[3] as well as in out-of-state markets is also anticipated. However, assuming a conservative average price of Rs. 50 per maund, the value of additional fresh water fish produced by 1966 would be about Rs. 90 lakhs.

Overhead Requirements and Marketing

5.41 Quite apart from the developments suggested in the foregoing sections, to achieve the envisaged increase in output it would be necessary to improve overhead facilities and bring about certain organizational changes.

5.42 Development of transport and marketing is the most important requirement of industry.

---

[1] On the assumption that 25 per cent of the additional water area consists of small tanks, another 25 per cent of medium-sized tanks and the remaining 50 per cent of large water areas, and that the fish yield in small tanks is 800 to 1000 lbs., in medium sized tanks 400 to 500 lbs. and large water areas about 200 lbs.

[2] On the assumption that the reclamation of swamps requires Rs. 2,500 per acre, major repair of derelict tanks Rs. 1,000 to 1,500 per acre and repair of small tanks a comparatively small amount and further that the cost of reclaiming large areas which will be used for irrigation will be borne by the minor irrigation and water supply projects.

[3] Besides the normal increase on account of growth in population, there is likely to be an additional increase as a result of higher ratio of urbanization and such other development as at Rourkela and Dandakaranya.

GSL

Available transport facilities are meagre and a restraining factor in the growth of the industry. Building of road-links between major producing centres and large consuming areas should receive high priority. In this connection, attention must be especially drawn to the road-link between Paradip and the present road-head near Kujang.

5.43 Substantial quantities of fish are also moved by rail. If the developments in marine and estuarine fisheries occur as envisaged, about 5,000 to 6,000 tons of fresh fish as well as some cured fish and fishery products would require rail transport. This would entail roughly a doubling of the existing facilities in terms of insulated and refrigerated vans.

5.44 To collect fish from the Chilka lake and other estuarine fish from widely scattered production centres, and to transport coastal as well as off-shore catch to the road-head of Kujang, carrier launches would be required until the Paradip-Kujang road-link is built. Currently, three such launches are being used in the Chilka lake and other estuaries; at least six to eight more will be needed by the end of the Third Plan.

5.45 To transport fish, ice, fish seed, fishery products and fishing equipment, it is estimated that about 60 to 70 trucks and other vehicles will be required during the Third Plan. These will include refrigerated trucks as well as those with insulated bodies.

5.46 Refrigeration facilities even for the current production are inadequate. To handle the increased output envisaged here, every important fish assembly centre will require an ice factory and a cold storage. For marine fish, Paradip will require an ice factory with 5 to 8 tons per day capacity and 15 to 20 tons capacity of cold storage. Other centres for marine fishing would need smaller capacity. For fresh water fishing, an ice factory of 2 to 3 tons per day capacity would be required, at least, at five or six centres and two cold storages at suitably selected centres. All large consuming centres would also require cold storage.

5.47 At present, fish consumed in the State is largely sold in the vicinity of the fisheries. Lack of proper transport and refrigeration facilities have hindered the development of proper marketing organization. With improved transport and cold storage facilities and increased output envisaged for the Third Plan period, organized marketing will become necessary. Co-operatives are the most practical and suitable form in which this could be achieved. In addition to cooperatives, there is need for a centralized source of marketing information and expert guidance. These functions could be undertaken by the State Fisheries Department through Fish Marketing Officers posted in each of the large production centres. To be more effective, the efforts of the cooperatives and Fish Marketing Officers would require coordination at the State level. This could be done by forming a State Fish Marketing Board with representatives of the Fisheries Department, cooperatives, trade, transport and cold storage and other agencies interested in the business.

COOPERATIVES

5.48 At present there are 77 fishermen's cooperative societies in the State with a membership of over 10,000. The Chilka lake cooperatives, which take the fisheries on lease for operation and undertake marketing as well form the bulk of the cooperatives. Besides increasing the number of such cooperatives and extending their functions to all aspects of the industry, the State should encourage the formation of new cooperatives for operating mechanized boats in coastal and estuarine fisheries by providing them with financial and other assistance.

TRAINING OF FISHERMEN

5.49 Fishing with mechanized boats and improved equipment would require skilled fishermen. Facilities for training fishermen have already been provided in seven centres in five maritime States: Bombay, Mysore, Kerala, Madras and Andhra Pradesh. It is recommended that Orissa should undertake to set up one or more such training centres as early as possible with the object of training at least 70 to 80 fishermen each year. In addition, it should also make arrangements to train 20 to 30 skipper-cum-master fishermen for the medium-sized off-shore fishing boats. The requirements of the Fisheries Department for technical personnel to promote and handle developmental activities would also entail provision of training facilities, which may be available in the institute which the Union Government is planning to set up.

ADDITIONAL OUTPUT AND INVESTMENT, 1960-61 TO 1970-71

5.50 The development envisaged in this chapter for the period 1960-61 to 1965-66 will require an investment of Rs. 3 crores and will result in an additional output of 26,500 tons of fish per year in 1965-66. Investment and output by type of fishery are summarized in Table 20.

5.51 Due to various difficulties, it is not possible technically to spell out the feasible growth potential for the different types of fisheries for the period 1966–71. However, on general considerations, a rough estimate of the over-all level of output likely to be reached in 1970-71, the utilization pattern and the magnitude of investment involved, has been made. If the average annual rate of increase in output envisaged for the period 1961–66 is maintained through the subsequent five-year period, the output in 1970-71 will be of the order of 100,000 tons.[1] The investment required for the additional output will be roughly Rs. 6 crores.[2]

UTILIZATION PATTERN IN FUTURE

5.52 It may now be useful to project the probable utilization pattern of the fish output in 1965-66 and 1970-71 and compare it with the present pattern. In 1957-58, about 4,000 tons of fish or 17 per cent of the total output was exported outside the State, and the remainder was available for human consumption, as the industrial demand was negligible. Over the next ten years, along with increases in fish output, new demands—industrial and export—are likely to emerge and develop. With the growth of fish-based industries in the State, a part from the increased fish output would have to be diverted to meet industrial demand. The fish meal and fish oil industries are expected to consume 3,000 tons or 6 per cent of fish output in 1965-66 and this is going to further rise to 10,000 tons or 10 per cent of the fish output in 1970-71. Exports of fish are also expected to go up to 9,000 tons in 1965-66, and to 18,000 tons in 1970-71. These leave 39,000 tons in 1965-66 and 72,000 tons in 1970-71 for human consumption in the State. (Table 21)

5.53 Mention was made at the beginning of this chapter of the comparatively low level of per capita consumption of fish in the State. Fish is one of the important protective foods and in a State which ranks among the first few in the high proportion of cereals in total food intake, the increase in fish consumption is of special significance. At the output level expected in 1970-71 and with the utilization pattern indicated above, fish consumption in 1970-71 will be 150 per cent higher than in 1957-58. (Table 21)

---

[1] Although no information is available regarding the optimum rate of exploitation of the Orissa fisheries, in view of the present low rate of exploitation this magnitude of expansion seems probable.

[2] This is on the assumption of a constant capital-output ratio and no significant change in the price level during this period.

INDUSTRIES BASED ON FISHERIES

5.54 Several industries based on fisheries would become possible with the expansion in fish output as anticipated. Industries utilizing fish directly as raw material are: fish curing, manufacture of fish meal oil, shark liver oil and hydralized proteins; processing of shark fins, shark skin and fish maws; canning of prawns and freezing of prawns. Industries ancillary or subsidiary to fishing industry are: manufacture of boats, nets, marine diesel engines, nylon filament and twine fishing equipment and agar-agar. The potential for these industries and the likely investment requirements are discussed in the chapter on Small Scale Industries.

Chapter 6

Minerals

PRESENT POSITION

ORISSA HAS ABUNDANT mineral resources, comparable to those of Bihar and Madhya Pradesh, the other two mineral-rich regions of India. The resources so far known are considerable and diverse, and the potential mineral occurrences give promise of discovery of large deposits. Moreover, several occurrences are yet to be explored and about a third of the State remains to be surveyed by the Geological Survey of India. Taking all these facts together, Orissa would have perhaps the largest mineral resources among all the mineral-bearing States of India.

6.2 If these resources had been systematically surveyed, prospected and exploited in the past, Orissa would have had by now a highly developed mining industry and possibly well-developed metallurgical and engineering industries. In a sense, however, it had been fortunate that the minerals of Orissa were not exploited during the pre-war and war years. Minerals are an exhaustible resource and any large scale development in the past would have only resulted in sizable exports of ores to the U.K. and through them to other parts of the world. To this extent, the nation would have been deprived of the valuable supplies of these minerals which are required in large quantities to build up metallurgical and engineering industries in the country and to earn valuable foreign exchange, under the Five Year Plans.

6.3 However, the main effect of the lack of development of mineral resources of Orissa was that despite the existence of vast resources, the net output of mining in the State in 1951 was only Rs. 4·52 crores—about 5 per cent of the all-India output (Table 26). The contribution of this industry to the State income, which was the lowest among all the States, came to about 1·5 per cent, compared with 3·8 per cent for Bihar,[1] and 1·8 per cent for Madhya Pradesh[2]—the other two mineral-rich areas in India. In 1951, Orissa's mineral industry provided employment only to some 39,000 persons, less than 0·6 per cent of the working force engaged in all productive activities. In Madhya Pradesh, during the same year mining industry provided employment to 80,000 persons[3]—0·64 per cent of the total labour force. The comparable figures for Bihar were 166,500 workers and 0·95 per cent. Even for the entire country, in which relative to the total area, mineral resources were poor compared to Orissa, a little more than 0·5 per cent of the working force was engaged in the mining industry.

6.4 During the First and Second Plans—especially during the Second Plan—there has been sizable development of this industry in Orissa. By 1956-57, the net output of minerals increased from Rs. 4·52 crores in 1950-51 to Rs. 6·4 crores, showing an annual average increase of about 7 per cent (Table 26). In India as a whole, the corresponding increase was about 3·9 per cent.[4]

---

[1] *Techno-Economic Survey of Bihar*, NCAER, p. 74.

[2] *Techno-Economic Survey of Madhya Pradesh*, NCAER, p. 224.

[3] *Ibid*, p. 192.

[4] *Mineral Production in India*, 1957, Indian Bureau of Mines.

GSL

By 1960-61, thanks to large scale development of iron ore mining for exports to Japan and supply to Rourkela and Bhilai steel plants, and of manganese mining for supply to ferro-manganese plants at Joda and Rayagada, the net output of mining industry is likely to increase to Rs. 8·98 crores (at 1957 prices)—an annual average increase of about 10 per cent over the 1956-57 level. The contribution of mining industry to the State income did not change materially by 1956-57. But by 1960-61 mining output is likely to account for about 3·6 per cent of the State income, thus more than doubling its share during the First Plan period. (Table 8)

6.5 By 1956-57, employment in mining reached a figure of 50,000 workers, 32 per cent increase over the 1951 level. By 1960-61, employment in mining in Orissa may be expected to reach a level of 82,000 workers (Table 61) if new mines are operated on a highly mechanized basis. The share of employment of mining industry in the total labour force would also increase from 0·6 per cent in 1950-51 to 0·8 per cent in 1956-57 and 1·2 per cent in 1960-61. (Table 89)

6.6 Compared with the principal mineral-bearing States, labour productivity in the mining industry of Orissa is lower. This is so specially because of lower degree of mechanization of Orissa's iron ore, coal and manganese mines and limestone quarries, heavy rainfall which frequently interrupts mining operations and poor health standards prevailing in Orissa. Overall labour productivity in Orissa's mining industry (i.e., net output per worker) in 1956 was Rs. 890. For the same year, for Madhya Pradesh, the estimate was Rs. 1,440 and for Bihar Rs. 1,386. The all-India labour productivity in coal mines, in 1956 is estimated at Rs. 1,860 in terms of the value of output and 111·2 tons per worker in physical terms. Corresponding figures for Orissa are Rs. 1,550 and 87·8 tons; for Bihar Rs. 1,740 and 114·7 tons; for West Bengal Rs. 1,920 and 114 tons; for Madhya Pradesh Rs. 2,050 and 125 tons (Table 25). The labour productivity in iron ore mines of Orissa in physical terms (131 tons) is a little higher than the all-India average of 127 tons, but a little lower in terms of value of output—Orissa Rs. 910, all-India Rs. 1,010. It is also better than in Madhya Pradesh, where iron ore mining has been developed only recently on a large scale. However, in Bihar—a comparable producer of iron ore—labour productivity both in physical and value terms (Bihar: 135 tons and Rs. 1,010) is higher than in Orissa. (Table 25)

6.7 In regard to manganese, the value of output per worker in Orissa is estimated at Rs. 1,010, compared with Rs. 1,220 for all-India and with Rs. 1,920 in Bombay, Rs. 655 in Andhra Pradesh, and Rs. 1,370 in Madhya Pradesh. These differences are partly due to larger proportion of low grade ores being worked in Orissa; but in physical terms an average mine worker in Orissa turned out 20 tons of manganese ores, against 16·3 tons in all-India, 20·5 tons in Bombay, 13·9 tons in Madhya Pradesh, and 18·9 tons in Andhra Pradesh, where, again the ore is of much inferior quality. However, in Bihar, where low grade manganese ores occur on the surface, labour productivity in physical terms is more than twice the estimate for Orissa. (Table 25)

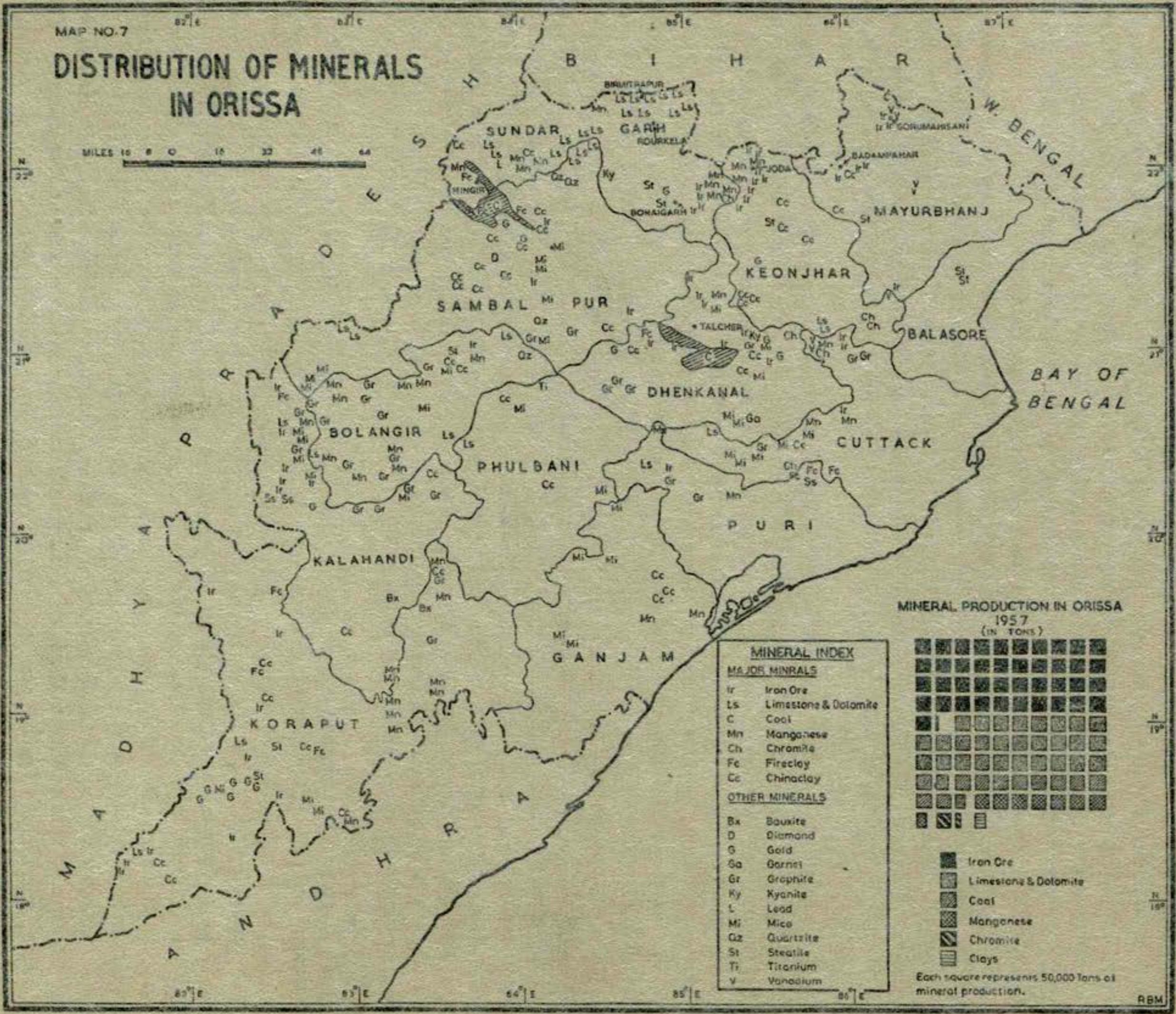
6.8 Historically also, the development of mineral industry in Orissa has been haphazard, and because of this crude methods of mining still predominate in most of the mines.[1] This situation, combined with the health problem and the interruptions caused by heavy rains in carrying out open cast mining, tends to lower labour productivity in the mining industry. More positively, labour productivity in mining industry of the State can be substantially raised with

---

[1] *Census Report*, Orissa, 1951, p. 10.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL



MAP NO. 7

DISTRIBUTION OF MINERALS IN ORISSA

improved methods of mining, mechanization of mining operations and improvements in the health of the workers.

DEPOSITS AND OCCURRENCES OF MINERALS

6.9 Orissa Inland Division, comprising Mayurbhanj, Kalahandi, Sundargarh, Bolangir, Phulbani, Keonjhar, Dhenkanal, Koraput and Sambalpur districts and Ganjam agency area, is a part of India's natural sub-region 3·3—the north-eastern plateau—which also includes Chhotanagpur division of Bihar, and East Madhya Pradesh division. This sub-region is the most highly mineralized area in India. The geological formations in the greater part of the sub-region comprise crystalline schists, gneisses and granites of Archaean age and at places large basins of sedimentary rocks of Purana group, and coal bearing Gondwanas. Consequently, the sub-region indicates occurrences of iron ore, manganese, bauxite, copper, coal, limestone, mica and other minerals such as kyanite, chromite, wolfram, tantalite, pitch blende, vanadiferous magnetite, asbestos, graphite and clays. Most of these minerals *occur mainly in the four inland districts of Mayurbhanj, Keonjhar, Sundargarh and Sambalpur*, in Orissa, with the difference that iron ore in the State is of much superior quality compared with the ores in Madhya Pradesh and Bihar; chromite is more abundant, and coal and manganese are of low grades. (Map 7)

Iron Ore

6.10 Orissa has "very adequate" reserves of iron ore, manganese, and limestone and dolomite.[1] The iron ore of Orissa has an iron content varying from 55 per cent to 69 per cent. The main iron ore concentrations are in Keonjhar district, Bonai subdivision of Sundargarh district and Cuttack, Mayurbhanj and Sambalpur districts. Fair-sized deposits are also found in Koraput district. The State has about one-third of the proved all-India reserves of high-grade exploitable ore. If the possible reserves of both high and low grade ores are considered, then the reserves of Orissa would amount to about 8,000 million tons, that is, 45 per cent of the all-India estimate. (Table 22)

6.11 Keonjhar district with about 1,000 million tons of proved reserves is the most important iron ore mining area in the State. Next comes Bonai subdivision of Sundargarh district. The ore from both these areas has a very high iron content, ranging from 60 to 65 per cent. Proved resources in Cuttack district are estimated at 31 million tons. Known reserves in Koraput district are small—10 million tons—and further investigations are required to ascertain their average quality.

Manganese

6.12 The known reserves of manganese ore in Orissa are also "very adequate" (Table 22) and amount to 10 million tons, eight per cent of the all-India estimate, as compared with 40 per cent in the bilingual Bombay State, 44 per cent in the reorganized Madhya Pradesh, 2·8 per cent in Bihar and 2·0 per cent in Andhra Pradesh. The average quality of the ore in Orissa is somewhat lower than that of the ores found in other States, such as Bombay, Bihar, Madhya Pradesh and Andhra Pradesh. The main concentrations of the better quality manganese ore are in Keonjhar and Sundargarh districts. Sizable deposits also exist in Koraput district in Kuttingi region. But the quality of this ore is inferior. Scattered deposits also occur in Patnagarh (Bolangir district). However, further investigations are required to prove the reserves and assess their quality.

---

[1] Reserves which can last over a hundred years or more, despite large scale mining.

Limestone

6.13 The limestone deposits of Orissa are also considered to be "very adequate", the proved reserves being estimated at over 50 to 60 million tons, and the possible reserves at more than 300 million tons (Table 22). Not all reserves, however, are of uniformly high quality limestone. The main concentrations are found in Sambalpur district, Birmitrapur and Gangpur in Sundargarh district, and in Koraput district. The limestone from Sundargarh district has an average of about 46 per cent of the calcium oxide and 1·5 per cent of magnesium oxide. Limestone in Gangpur also gives similar analysis. But in Birmitrapur, limestone has a high content of silicon oxide (sand). The limestone found in Koraput is of a superior quality with about a content of 96 per cent of calcium carbonate. Proved reserves in Sambalpur, and Sundargarh districts are estimated at 110 million tons and 280 million tons respectively. In Koraput district, there are proven reserves of about 30 million tons and possible reserves of 60 million tons.

Dolomite

6.14 The best known Indian occurrences of dolomite are in Birmitrapur region (Sundargarh district) in Orissa. The reserves in this region are estimated at 250 million tons, of which 84 million tons are of high-grade variety. In Sambalpur district, the reserves are estimated at 5 million tons, but the mineral is siliceous. There are also minor deposits in Koraput district. (Table 22)

Coal

6.15 The proved reserves of coal in Orissa are estimated at about 800 million tons. These are also classed as "very adequate". But the entire deposits are of non-coking coal. Talcher in Dhenkanal district has 100 million tons of reserves. Hinger-Rampur in Sambalpur district is another region in the State where the reserves are estimated to be 700 million tons; but the coal from this area has a high ash content and is inferior to Talcher coal. Data on possible reserves are not available, but these are expected to be much more than the known reserves. There is, nonetheless, little hope of finding any occurrences of coking coal in Orissa, although further investigations are necessary to confirm this view. (Table 22)

Chromite

6.16 So far, Orissa is the only State which produces chromite on a large scale. Mysore and Bihar are the other States where small quantities are mined. However, the mineral also occurs in Bombay, Andhra Pradesh and Madras. Known reserves of chromite in Orissa are estimated at more than 520,000 tons, 35 per cent of all-India reserves. (Table 22)

6.17 Keonjhar, Cuttack and Dhenkanal districts are the main regions where chromite occurs in large quantities, the known reserves being estimated at 200,000 tons each in Keonjhar and Cuttack districts and 120,000 tons in Dhenkanal district. The quality of Keonjhar ore is assessed at 44 to 57 per cent of chromium oxide content, and is considered to be sufficiently good for economic exploitation of the mineral. In Cuttack district, part of the ore is of high grade; it is being currently worked in the Sukinda area.

Bauxite

6.18 Bauxite is known to occur in Orissa, and the proved reserves are currently estimated at 200,000 tons. But further investigations are necessary to make reliable estimates of proved and indicated as well as possible reserves.[1] The quality of the mineral also needs to be assessed by more extensive analysis. The available data show that bauxite in Orissa has 28 to 60 per cent of aluminium oxide. The ore is suitable for production of aluminium. The mineral occurs at great heights on the tops and slopes of mountains in Kalahandi and Sambalpur districts. There are also reported deposits in Koraput district. In the event of large reserves being proved, the establishment of primary transport facilities between the mining areas and railheads and convenient roads is likely to present a difficult problem in any scheme of exploitation of this mineral.

China Clay

6.19 Reserves of china clay are also reported to be "adequate",[2] but data regarding their quality, and the extent of proved and possible reserves are not available. More investigations to establish the quality of clays occurring in the main areas, and the extent of reserves, are necessary. The existing knowledge is limited to the fact that china clays occur in the districts of Mayurbhanj, Koraput, Sambalpur, Sundargarh and Keonjhar. These clays are suitable for ceramics and pottery industries but the lack of adequate scientific data appears to restrict their exploitation.

Fire Clay

6.20 Fire clay deposits are mainly confined to Sambalpur district, though the clay is also found in the districts of Dhenkanal and Puri. Known reserves are "adequate", but the data on the quantity and quality of possible reserves are meagre. Available data on fire clay analysis show that the clay from Sambalpur district contains 50·34 per cent of silicon dioxide, 34·30 per cent of aluminium oxide and 1 per cent of iron oxide. This clay is considered suitable for manufacture of refractories, and similar clays may be found in other areas in Sambalpur, and Dhenkanal and Puri districts. More detailed and extensive investigations to prove the quantities of reserves and assess quality of clays are, therefore, justified and necessary to facilitate the increased exploitation of fire clays of Orissa.

Other Minerals

6.21 Vanadium, graphite, kyanite, titanium, gold, mica, diamonds, ochres, ilmenite, lead, garnet, beryl, quartzite, sand (silica) and steatite are the other minerals which occur in various

---

[1] Reserves which can last over a period of 50 to 100 years with reasonable exploitations.

[2] On the basis of Geological Survey of India records the possible reserves have been estimated at 848,000 tons.

GSL

parts of Orissa; but the prospects of their development depend entirely upon further geological investigations to identify potential areas, ascertain the extent of reserves and assess their quality. Thus considerable basic work remains to be done, before their economic exploitation could be considered. Orissa with its long coastline, is also one of the salt producing States. But the production costs are high and the quality of salt not satisfactory for industrial use. This was because during the period, production in Madhya Pradesh, Bihar and West Bengal increased to a larger extent than in Orissa.

PRODUCTION TRENDS

6.22 Table 25 read with Table 22, shows how poor is the exploitation of minerals with "very adequate" and "adequate" reserves—iron ore, manganese, limestone, dolomite, coal, chromite, bauxite, and the clays—and how very diversified are the potential mineral resources of Orissa. However, exploitation of mineral resources is entirely dependent upon the current and potential demand of minerals from metallurgical and other mineral-based industries in the country, and from foreign markets. The demand has been growing rapidly in recent years, and therefore the prospects of rapid increase in the output of major minerals of Orissa—iron ore, manganese, limestone, dolomite, chromite, coal, clays and bauxite—are quite bright. There is some evidence to show that the beginning of this growth has been made in Orissa. However, the extent of expansion so far, has not been uniformly large for all the minerals.

Iron Ore

6.23 Between 1950 and 1957 iron ore output in the State increased from 1·528 million tons to 2·054 million tons, i.e., by 34·5 per cent (Table 24). However, during the same period, the share of Orissa in the all-India production declined from about 52 per cent in 1950 to 40 per cent in 1957, because of development of iron ore mining in Andhra Pradesh, Mysore, Bombay and Rajasthan (Table 27). Moreover, the increased output was produced throughout the period with the 32 mines which existed in 1950 (Table 23). Thus, the development of iron ore mining in Orissa has not been as large as would be justified considering the vast resources of the State and the high quality of the ore. By 1961, however, iron ore production is likely to reach a level of about 4 million tons.

Manganese Ore

6.24 The development of manganese mining in Orissa has, however, been more spectacular though not without ups and downs. Between 1950 and 1957, the number of mines increased from 82 to 89 (Table 23). Five new mines have come up in 1956 and two in 1958—three new mines have come up in Koraput, two in Bolangir, two in Sundargarh and one in Sambalpur district (one mine in Keonjhar district closed down during the period). The output of manganese ore increased by about 150 per cent, from 151,000 tons in 1950 to 382,000 tons in 1957 (Table 24). During this period the share of Orissa's manganese output in the all-India production, also increased from 17·1 per cent to nearly 23·1 per cent (Table 28). Owing to increasing demand for export, the production reached a peak of 432,000 tons in 1953. But, thereafter, the decline in export demand brought down the output to a level of 347,000 tons in 1955. Since

CSL

then, however, the internal demand of the ore for India's steel industry has been increasing and the manganese output in India as a whole and in Orissa has been rising, though not at the rapid rate that prevailed between 1950 and 1953, when the Indian ore was in great demand in the U.S.A., Japan, the U.K. and Germany. By 1961, the production of manganese ore in Orissa is expected to reach a level of 400,000 tons, i.e., an increase of about 4·7 per cent over the 1957 level. The State's share in the all-India production is expected, however, to increase from 23·1 per cent in 1957 to a little over 33 per cent in 1961. This would be mainly related to the increasing demand of ferro-manganese for the growing steel industry of the country, rather than to any growth of export demand.

Coal

6.25 The output of coal in Orissa also shows a marked upward trend. There were six coal mines operating in the State throughout the period 1950–57. Coal production increased from 376,000 tons in 1950 to 532,000 tons in 1957, i.e., by 41 per cent. The coal output had reached the peak level of 603,000 tons in 1956. However, by 1958 the output declined by 15 per cent, owing to the flooding of the Hirakud reservoir, which resulted in the closure of collieries at Rampur. In 1959, the upward trend was picked up again, the production during this year being 606,000 tons (Table 24). The uptrend was mainly due to increasing demand by railways in Orissa and new industries coming up in Orissa as well as in the adjoining States. The share of coal production of Orissa in the all-India output is small. In 1950, the output of coal from collieries in Orissa amounted to only 1·2 per cent of the all-India production (Table 28) and this production has remained more or less constant over the last 10 years or so. It is also unlikely that the State's share in the all-India output will increase in the future. The State's coal potential has, however, great significance for the expansion of railway transport and power as well as the growth of industries, within the State.[1]

Chromite

6.26 Chromite mining in Orissa showed the most spectacular expansion after 1950. In that year the State produced barely 2,000 tons of chromite. In 1957, the output had increased to 69,000 tons. During the period the number of chromite mines in the State increased from four to six. The growth is largely due to the increased demand for Indian chromite for export to the U.S.A., Japan and China. Owing to the concentration of the country's chromite deposits in Orissa and the lack of exploitation of the deposits in other chromite-bearing States, e.g., Mysore, Bihar, Bombay and Andhra, Orissa's share in all-India output also increased from 13·5 per cent in 1950 to 87·8 per cent in 1957 (Table 28). The State's chromite mining is, therefore, of great national importance. Increased exploitation of chromite deposits in the State should in future attract ferro-chrome and other alloy steel industries to Orissa.

Limestone

6.27 In recent years, the limestone output has also increased substantially from 707,000 tons in 1950 to 1·363 million tons in 1957, an increase of over 78 per cent in seven years (Table 24).

---

[1] Talcher coal may also be used for blending with metallurgical coal for the existing and future steel plants in the State.

The increased output was secured through the expansion of six quarries existing in 1950. The production increased steadily between 1951 and 1953. Between 1954 and 1956 there was some decline in the output. In 1957, the production increased and again reached the highest level of about 1·4 million tons. However, the State's share in the all-India output declined sharply from 31 per cent in 1950 to 14·5 per cent in 1957 (Table 28). This was because of large increases of limestone output during this period in other States, particularly Andhra Pradesh, Rajasthan, Madras and Bihar.

Dolomite

6.28 The output of dolomite has also shown very large increase from 48,000 tons in 1950 to 136,000 tons, an increase of about 183 per cent in seven years (Table 24). The increase was secured through expansion of four quarries existing in 1950. The largest increases occurred during 1954, 1956 and 1957, because of the expansion of cement industry in Orissa. Between 1950 and 1953 the output increased unevenly from 48,000 tons in 1950 to 56,000 tons in 1951, 50,000 tons in 1952, and 62,000 tons in 1953. Orissa is the largest producer of dolomite in India and in recent years the State's share in the national output also increased from 90·8 per cent in 1950 to 96·6 per cent in 1957 (Table 28). The increased production of dolomite is due to greater demand from the expanding steel industry.

China Clay

6.29 China clay output also showed a spectacular increase, rising by about 480 per cent from a level of 3,000 tons in 1950 to about 17,500 tons in 1957 (Table 24). This increase was secured through expansion of five quarries existing in 1950. During the period, the State's share in all-India output increased even more significantly, from a mere 5·8 per cent in 1950 to 9·7 per cent in 1957 (Table 28). This was mainly because of increased exploitation of Orissa's large deposits to meet the demand of expanding ceramics and potteries industry in the State and in other parts of India.

Fire Clay

6.30 The State's fire clay production has also shown an uptrend in recent years, though the rate of increase was neither large nor uniform from year to year. The output increased from a level of 11,000 tons in 1950 to 19,000 tons in 1957, after having reached a level of 18,700 tons in 1952 and declining to 10,500 tons in 1954 (Table 24). Thereafter, the increase was fairly large and uniform and particularly marked in 1957, because of increased demand from Bihar for manufacture of refractory bricks, and the new refractory plants set up in the State. The number of quarries also increased from one in 1950 to three in 1956. The share of the State's output in the all-India production increased from 9 per cent in 1950 to 11·64 per cent in 1957. (Table 28)

Other Minerals

6.31 Bauxite production is yet to be developed in Orissa. Likewise, graphite and kyanite production is in the initial stages of development. Graphite output increased from 632 tons in

1950 to 1,164 tons in 1952, but declined to 381 tons in 1953. Thereafter the output again increased reaching a level of 976 tons in 1957 (Table 24). However, the State's graphite deposits are scattered and small, and even with beneficiation there is not much hope of developing large scale production.

6.32 The production of kyanite is also based upon small occurrences, and the experience in recent years does not hold out any prospects of increasing the output of this mineral.

6.33 No other mineral has yet been proved or worked, although the occurrence of such minerals is either indicated or reported.

6.34 The production of common salt (which is conventionally dealt with as a mineral) is, however, on the decline in recent years. The State's salt output estimated at 32,976 tons in 1950 increased to 54,138 tons in 1953, but declined sharply to 26,168 tons in 1954. Thereafter, it increased to 32,299 tons in 1955 and 50,521 tons in 1956, but again fell to a level of 44,398 tons in 1957. The high cost of salt production and the availability of cheaper and better salt from Saurashtra and Madras are the main causes of a fluctuating salt output in Orissa. Presently, Orissa's share in all-India output is about 1·1 per cent (Table 28) and unless the cost of production can be brought down and the quality improved, it is likely that this proportion may decline in the future.

UTILIZATION

6.35 To derive the fullest economic benefit, a mineral-rich region should aim at "maturing" its mineral resources to the optimum extent possible, by developing "weight-losing" resource-based industries and local market-oriented metal-based industries; it should also aim at the production of graded and beneficiated ores for international markets with a view to earning valuable foreign exchange, and establish export trade with other industrial areas in the country so as to enhance the capacity of the region to import consumer goods, industrial raw materials and engineering products from other parts of the country.

6.36 Judged by these criteria, until recently the minerals base in Orissa was lacking in "matured" development. During the Second Plan, however, a good beginning has been made to establish several mineral-based industries in the State, to exploit its iron ore resources for the export market, and to produce beneficiated manganese ore for supply to industries within the State, in other parts of the country, and for export. Two ferro-manganese plants are working in Orissa. This process must continue in the future, and pursued more vigorously, if Orissa is to derive fuller benefit from its mineral wealth.

6.37 Statistics for a detailed study of the manner of utilization of the State's mineral resources are not available, and these need to be patiently collected and analysed for achieving fuller utilization of the State's mineral resources and integrated industrial planning of Orissa. However, broad facts culled from various sources indicate that the State can aim at better utilization of its mineral resources.

6.38 Almost till the end of the First Plan, mineral deposits in the State were being worked mainly to supply raw materials for metallurgical and other industries, e.g., steel, cement, refractories, potteries, etc., situated in Bihar and West Bengal. The deposits of major minerals of the State are adequate both in terms of quality and quantity, for the establishment of several technically and economically feasible mineral-based industries, within its boundaries, and these industries could have been established during the First Plan. The position has, however, improved considerably since the beginning of the Second Plan during which the Rourkela Steel Plant and cement and refractory industries were established in the State; and iron ore deposits were worked not only to supply ore to Rourkela and steel plants in Bihar and West Bengal, but also to develop export trade in iron ore with Japan.

Iron Ore

6.39 The iron ore of Orissa is of hematite type and is of a high grade containing more than 60 per cent iron. The proved deposits are also classed as "very adequate". Iron ore resources of the State are thus suitable for the economic production of pig iron and steel within the State. Orissa's ore is being used by the Tata Iron and Steel Works in Bihar, the Indian Iron and Steel Company in West Bengal, and in recent years by the Durgapur Steel Project and the Rourkela Steel Plant. Since 1957, the ore is also being extracted to develop export trade with Japan. In 1957, 1·4 million tons of the State's iron ore were exported to Japan accounting for about 50 per cent of the total iron ore exports of the country. The State's contribution to foreign exchange earnings secured through exports of iron ore amounted to about Rs. 5·9 crores. By 1961, all-India exports of ore are likely to reach a level of four million tons, and Orissa's contribution to 50 per cent of the all-India exports. Considering the vast resources of high grade ore in Orissa, the development of iron ore mining in the State, specially as foreign exchange earner, holds out bright prospects. Direct data on internal utilization of the State's ore output are not available, but an indirect estimate for 1957 places the figure of local ore consumed by steel plants in Bihar and West Bengal at about 700,000 tons. The ex-mine price of Orissa's ore averaged to about Rs. 10 per ton in 1957, and the f.o.b. Calcutta price of this type of ore came to Rs. 43 to 53 per ton. However, the price at steel works would be about Rs. 10 per ton, as most steel companies own and operate their own mines.

Coal

6.40 Currently, out of the annual output of coal of about 600,000 tons, about 258,000 tons are consumed at present by industries and power houses, and the balance by the railways.[1] The quality of coal found in Orissa is inferior and the bulk of the deposits show a high ash content and a high degree of volatility. Orissa's coal resources, therefore, cannot be used for coking purposes or for basing chemical industries without beneficiation. Talcher coal is, however, suitable for the production of soft coke by low temperature carbonization process. More coal can be used for thermal power generation, and for blending with metallurgical coal for use in steel works. There is, therefore, a good prospect of the coal resources of the State being put to uses which can bring fuller economic benefits—direct as well as indirect—to the State economy.

Manganese

6.41 Until recently, till about 1954, the bulk of the manganese ore mined in the country was exported to the U.S.A. (46%), France (12%), Japan (9%), the U.K. (7%), Netherlands, Belgium, West Germany, Italy, Sweden, Norway and few other countries (26%).

---

[1] *Statistical Abstract*, Orissa, 1957.

GSL

Nearly 1·7 million tons of ore including ferruginous ore, valued at Rs. 31·5 crores was exported to these countries in 1957. Orissa's share in this trade was about 22 per cent. Almost the entire manganese output of Orissa has been geared to export market. However, in recent years about 80,000 to 85,000 tons of ore were utilized for the manufacture of ferro-manganese at the new ferro-manganese plants at Jeypore and Joda. In addition to this, a small tonnage would also be consumed by steel works for the manufacture of pig iron and ferro-alloys. All-India consumption of manganese ores for these purposes was about 90,000 tons in 1956, but sharply declined to 32,500 tons in 1957. This form of use of manganese ore would not appear to be promising in the near future. Moreover, unlike in Madhya Pradesh and Bombay States, over 70 per cent of the ore from Orissa mines is of low or medium grade and hence not suitable for highly competitive export markets. Beneficiation of State's low grade ores should in future be developed as an important industry in Orissa, if the export markets for Orissa's ore are to be cultivated. This is particularly important in view of the fall in export demand caused by keen competition from Brazil, which produces high grade ore for export to the U.S.A. Export prices of manganese ore averaged Rs. 186 per ton in 1957. The ex-mine price in Orissa was about Rs. 70 per ton.

Limestone

6.42 The average quality of limestone found in the State is generally suitable for use in cement and lime manufacture. High grade limestone, containing 96 per cent of calcium carbonate reported to occur in Koraput district, would be suitable as basic raw material in metallurgical and chemical industries, e.g., nitro-chalk, calcium carbide, etc. For the present, however, except for about 450,000 to 500,000 tons, used in the cement factory at Rajgangpur and a small quantity used by the local lime burning industry and the Rourkela plant, the bulk of the output is exported for use in cement and steel plants in Bihar and West Bengal. Orissa's limestone fetches about Rs. 9 to 10 per ton f.o.r.

Dolomite

6.43 Almost the entire output of dolomite (136,000 tons) is being used as refractory lining and metallurgical flux by the existing steel plants. However, more reserves exist and these should be developed to meet the growing demand of the expanding steel industry.

Chromite

6.44 Chromite deposits of Orissa are being worked mainly for export of the ore to the U.S.A. and Japan. However, in recent years this trade has suffered a set-back because of the competition from Rhodesia, Nyasaland, the Union of South Africa, and Turkey, and also because of the recession in the steel industry of the U.S.A. during 1956–58. At any rate, to "mature" this mineral it is necessary to develop alternative uses for it, e.g., for manufacture of chromite refractories, chromium compounds, and manufacture of ferro-chrome alloy for stainless steel industry. In 1957, the total exports of chromite, the bulk of which went to the U.S.A. and Japan, amounted to about 41,000 tons valued at Rs. 50 lakhs giving an average export price of Rs. 122 per ton. Pit-mouth price for low grade ore (below 48% Cr_2O_3 content) was about Rs. 16 per ton, and the average price was about Rs. 37 per ton. Orissa has the bulk of chromite deposits of the country and the ore is of a high grade. The use of chromite for the economic manufacture of ferro-alloys, refractories for steel industry and chromites and dichromites of sodium and potassium which are extensively used in chemical industries (tanning and dyeing industries), therefore, holds out good prospects in the years to come.

China Clay

6.45 At present the china clay of Orissa is being exported to West Bengal and Bihar mainly for use in ceramics industry. The quality of clays found in Orissa is, however, suitable for use in rubber, textiles, paint and paper industries. The country is at present short of high grade china clay required by different industries—imports in 1956 and 1957 were about 4,000 to 7,000 tons. Moreover, the demand for the clays within the State as well as in the country as a whole is bound to grow with the growth of clay using industries—ceramics, paper, paints, textiles, etc. There is, therefore, good scope for further exploitation of china clay resources of the State in the years ahead. But in the case of Orissa, fuller utilization of the resources is dependent upon further investigation, prospecting and systematic analysis of local clays.

Fire Clay

6.46 The fire clay output of Orissa is largely used by the refractory industry in the State. Other uses of fire clay are for the manufacture of high temperature retorts and crucibles and stoneware pipes. Manufacture of these products may become possible in Orissa if on a more systematic analysis adequate quantities of quality clay are proved, and washing plants set up. The demand for these products is certain to grow during the next decade and thereafter. Available data relating to reserves and quality of clays and the prospects of demand indicate the possibility of using local fire clay for manufacture of sanitary wares. There is hardly any export of fire clays from the country or any import of clay as such. The price at the pit-mouth varies widely, but the highest price quoted for Sambalpur clay in 1957 was about Rs. 22 per ton.

Other Minerals

6.47 Among other minerals, the small quantities of graphite found in Orissa are exported mainly to West Bengal and Andhra Pradesh after beneficiation at Titlagarh (Bolangir district) in Orissa. Likewise small quantities of kyanite mined in Orissa are exported to Bihar and West Bengal for use in ceramics, glass and pottery industries. If larger output of this mineral is proved to be an economic proposition for Orissa, the local supplies can also be used for the State's ceramics and refractory industries. Kyanite output of India is largely exported to the U.K., the U.S.A. and other countries. But the exports do not show an upward trend. The production of kyanite in Orissa for export, therefore, does not appear to have bright prospects and future development will have to depend on internal demand from India's expanding refractory, ceramics and glass industries. The price of kyanite of good quality (60% Al_2O_3) may range from Rs. 300 to Rs. 325 per ton.

6.48 Common salt produced in Orissa is utilized for human consumption and for preservation of fish. But because of the inferior quality of salt made in Orissa and the high cost of obtaining better variety of product by purification, the use of indigenous salt resources as raw material for manufacture of chemical products, e.g., caustic soda, soda ash, etc., is not considered economic.

GSL

However, in the years to come indigenous salt will be required in increasingly larger quantities for human consumption and also for the expanding fish industry of the State.

6.49 Bauxite resources of Orissa are yet to be proved and assessed. But the quality of the ore from the few known deposits is considered suitable for manufacture of alumina, aluminium and high temperature refractories. Fuller utilization of this mineral within the State, therefore, appears highly probable, but is dependent on further investigations and prospecting.

6.50 Vanadium deposits of Orissa are reported to be adequate, but these are yet to be worked. With regard to their vanadium content widely varying quantities of vanadium pentoxide (V_2O_5) have been reported. The available published analyses are only few and highly inadequate for an economic investigation, particularly in the context of occasional high values up to 5 per cent being reported. Hence without a proper large scale sampling no reliable conclusion can be drawn.

6.51 Moreover, vanadium occurs within the magnetite lattice itself, substituting for the Fe ion. Therefore, a vanadium concentrate cannot be obtained by beneficiation. It is a problem in extractive metallurgy and the matter is under investigation at the National Metallurgical Laboratory which is conducting pilot plant tests.

6.52 In this context, it may be mentioned that elsewhere in the world, requirements of vanadium are drawn from other types of ores, e.g., sulphide ores, hydrated vanadium ores, vanadium bearing micas and vanadates of lead which are more easily treated. In our own country, vanadium in green micas, ashes of coal and oil, laterites, bauxite and blast furnaces slags would be capable of easier extraction.

6.53 Of the other minerals of Orissa which are still to be assessed and exploited, beryl can be used for production of beryllium of reactor grade for atomic power plants and several alloys such as beryllium-copper, beryllium-aluminium and beryllium-nickel. So far there are no prospects for development of export trade in this mineral.

6.54 Copper is another mineral which is reported to occur in Orissa. If detailed prospecting establishes the existence of workable deposits, then copper mining can be developed in Orissa to increase the indigenous supplies of copper through the expansion of the existing smelter at Ghatsila in Bihar or the establishment of a new one in Orissa, and to win atomic minerals from copper tailings.

6.55 Diamond bearing gravels are reported to be submerged in Hirakud reservoir, and offer little prospects of exploitation and further use for industrial purposes. However, garnet occurrences in the State are suitable for use in the manufacture of abrasives, provided stones of required grain size, hardness and shape can be produced.

6.56 Ilmenite is another important mineral which can be used for the production of titanium metal which is required for the manufacture of high strength structural steel, aeroplane frames and aero-engines and jet planes and also for atomic power plants. Export market for the ore and the metal is promising. But these uses would be feasible only if economic production of the ore and the metal can be established in the State, as in Madras and Kerala. The State's deposits of lead and galena and mica offer little prospects of economic exploitation, much less of any "matured" development.

GROWTH OF MINING INDUSTRY, 1961-71

6.57 The growth of mining industry in Orissa depends upon the demand for various minerals

GSL

occurring in the State from the existing and the new mineral-based and metallurgical industries, and also upon the probable increase in demand from international markets, during the next few years. The estimates of expansion of mineral output in Orissa, which is technically feasible and economically justified, are based on these considerations, and cover a period of 10 years from 1961 to 1971.

Iron Ore

6.58 The most significant development over this period should be in iron ore mining. In all, by 1971, iron ore output in Orissa will have to be increased from its 1961 level by about 22 million tons (Table 29). Of this about 5 million tons would be required for Durgapur and Rourkela plants and the proposed plant at Bokaro, and possibly an additional 4 million tons to meet the increased export demand during the Third Plan period. In the Fourth Plan period, expansion of the steel plants would require a further 3 million tons and the proposed steel plant at Bonaigarh in Orissa about 4 million tons. A further 6 million tons would be needed for export to other countries during the Fourth Plan period. Estimated fixed investment for this development would be about Rs. 40 crores (Table 29)—about Rs. 15 crores in the Third Plan and Rs. 25 crores in the earlier phases of the Fourth Plan. It is expected that increased mining of iron ore will create about 140,000 additional jobs, and would need some 4,000 kW of additional power. As a result of this development, iron ore output in the State should increase from about 4 million tons in 1961 to about 26 million tons by 1971—an increase of some 550 per cent over the 1961 level. Apart from increasing the indigenous steel production and saving of foreign exchange to the tune of Rs. 30 crores, this growth will enable the country to earn during the next decade, an additional amount of foreign exchange of about Rs. 50 crores through the export of 10 million tons of iron ore at the current export price (i.e., Rs. 50 per ton). The main location of this growth will be in Sundargarh, Keonjhar and Mayurbhanj districts.

Manganese

6.59 In view of the increase in output of ferro-manganese, envisaged during the period 1961–71, about 150,000 tons of additional ore will have to be mined (Table 29), principally to meet the demand of the expanding output of ferro-manganese produced by the plants at Joda and Rayagada. Export trade in Orissa's ore can also be increased by another 100,000 tons of high grade ore, if beneficiation of low grade ores is undertaken in the State. This activity would necessitate the mining of another 150,000 tons of ore, which will require an investment of the order of Rs. 1·7 crores and create an employment potential of 10,000 jobs by 1971. This growth should be largely phased according to the growth of steel industry in Orissa, with a small time-lag. Increased mining of ore for beneficiation should, however, be developed at a steady rate of about 15,000 tons a year over the ten-year period. As a result of all this the development output of manganese ore in Orissa should increase from a level of 400,000 tons in 1961 to 700,000 tons in 1971, i.e., an increase of 75 per cent over 1961 level. Additional foreign exchange earning made possible through this development would be Rs. 3 crores.

Coal

6.60 In order to cater to the increased demand from the railways and the expanding and new metallurgical and other mineral-based industries, paper industry, and chemical and allied industries, the coal output in Orissa must also be developed substantially over the present decade. On the basis of the probable growth of industries, it is estimated that in Orissa coal production should be increased from the present level of about 600,000 tons to 3·9 million tons by 1971, i.e., by about 550 per cent (Table 26). This growth will require additional investment of the order of Rs. 15 crores (Table 29) and create by 1971 an employment potential of about 30,000 jobs, and an income potential of Rs. 5·8 crores a year. The growth of coal mining may be achieved over the ten-year period at a more or less uniform rate of 300,000 tons per year.

Limestone

6.61 Considering the possibilities of growth of cement, refractories, lime burning, ferro-manganese, nitro-chalk and glass industries in Orissa over the next decade, limestone output in the State will have to be doubled over the period. This would mean an additional output of 3·5 million tons by 1971. The investment requirement for this development will be small—only about Rs. 15 lakhs. The employment potential of this development is estimated at 14,000 workers, and the income potential at Rs. 2·37 crores by 1971.

6.62 These are the major developments in the field of minerals which must take place in the State during the present decade as otherwise neither the new mineral-based industries can be established in Orissa, nor the existing ones expanded. It is also important that the development of mining output should take place a little ahead of the establishment of related industries; otherwise raw material and fuel supplies will become irregular, inadequate and uncertain, and this will lead to creation of idle capacity in the new industries.

Chromite

6.63 Among other minerals, mining of chromite should be developed in Keonjhar district to support the proposed ferro-chrome plant. The extent of development envisaged is an additional 20,000 tons of chromite ore by 1965, thus increasing the current output of about 80,000 tons to a level of 100,000 tons. (Table 29)

Quartzite

6.64 To meet the demands of proposed new refractory and glass industries in Orissa, the present output of quartz, i.e., glass sand, bauxite, china clay and fire clay has to be increased substantially by 1971, e.g., quartzite by 50,000 tons, glass sand by 60,000 tons, bauxite by 25,000 tons and fire clay by 400,000 tons (Table 29). The investment necessary for the development of all these minerals would be less than Rs. 20 lakhs, and the employment potential, about 6,500 jobs. The additional incomes created by these industries by 1971 would be of the order of Rs. 39 lakhs. This is the minimum growth necessary for these minerals and it must be brought about during the decade 1961–71, as otherwise, the proposed refractory and glass industries cannot be established in Orissa.

Bauxite

6.65 Bauxite deposits of Orissa should be thoroughly surveyed to prove adequate economic reserves and to assess their quality; for if adequate deposits of high grade bauxite can be established, Orissa can not only use the indigenous ore for the existing aluminium plant, but also plan for another plant based on local bauxite in the future, possibly in the Fifth Plan.

Other Minerals

6.66 All the other minerals found in Orissa, in particular vanadium, kyanite, copper, beryl and sillimanite, require further investigations to prove the quantum and quality of reserves. These investigations should be taken up during the Third Plan. For this purpose the staff of the State's Mining Geological Department is not adequate. It should, therefore, be greatly strengthened without delay. As the primary geological investigations rest with the Geological Survey of India, the Government of India should be approached to give special attention to the matter of geological surveys and investigations required in Orissa, to prove and assess the State's mineral resources.

THE IMPACT OF ECONOMY

6.67 The impact of this growth in the mining industry of Orissa during the next ten years would be an increase in its net product (at 1956-57 prices) from a level of Rs. 8·98 crores in 1961 to Rs. 42·223 crores by 1971, i.e., by about 470 per cent. The development on this scale will require investment in mining to the tune of Rs. 60 crores. The aggregate employment potential of this growth is placed at an additional 211,000 workers, of which a little over 33 per cent would be skilled and semi-skilled and managerial personnel, and the balance of 67 per cent, unskilled workers. The total power requirements for this growth would be between 23 to 24 MW. If, as is necessary, adequate mechanization is effected for the mining of iron ore, manganese and coal, the productivity of mine workers, measured by net output per worker would rise from a level of Rs. 1,380 per worker in 1961, to about Rs. 2,000 by 1971.

6.68 Regionally, growth in net output and employment over the next decade will take place mainly in Sundargarh, Keonjhar and Mayurbhanj districts. Out of the aggregate increase of Rs. 33·2 crores in the net output, nearly Rs. 26·5 crores (or 80%) will occur in these districts, because of large scale development of iron ore and manganese mining and increased exploitation of limestone deposits. Sambalpur district will benefit by an additional net output of Rs. 4 crores due to the expansion of coal output, and exploitation of quartzite and fire clay. There will also be increases in the net output of Dhenkanal and Kalahandi districts to the tune of Rs. 1 crore, owing to increased exploitation of fire clays and silica for refractory and glass industries. As a result of this development during 1961–71, employment opportunities in Sundargarh, Keonjhar and Mayurbhanj districts will increase by 170,000 jobs. But in respect of Sambalpur district, and Dhenkanal and Kalahandi area, the increases will be of the order of 25,000 and 10,000 jobs respectively. Likewise, out of the total power requirement of 23·5 MW for the new developments in the mining sector, about 11 MW will be required in Sundargarh, Keonjhar and Mayurbhanj districts, about the same amount near Talcher in Sambalpur district, and the balance in Kalahandi and Dhenkanal districts.

CSL

CONDITIONS FOR DEVELOPMENT

6.69 The prospects of bringing about large scale development of mineral industry in Orissa during the next ten years are quite bright. But such developments are dependent upon several conditions which must be fulfilled. The basic conditions are as follows:

(*i*) Under the Central plans, State plans and plans of the private sector, new capacities for technically feasible and economically sound mineral-based industries should be established in Orissa to the maximum extent possible and within economic distances of the mineral deposits.

(*ii*) Export trade in minerals should be systematically expanded.

(*iii*) Beneficiation of low grade ores, e.g., manganese ore, should be encouraged to assist the expansion of export trade in highly competitive foreign markets, as well as in other States of the country.

(*iv*) A coal washery should be established in the State to widen the markets for Orissa's coal.

6.70 Other conditions of development relate to removal of various bottlenecks which impede the progress of mining industry in Orissa currently and are likely to create serious problems in future in relation to the large scale expansion of minerals output in the State over the next ten years.

Transport Facilities

6.71 One of the most serious problems for large scale development of mining industry in Orissa is the utter inadequacy of transport facilities. For the development of a large export trade in iron ore, efficient road and rail transport facilities from Kirburu (Keonjhar district) mines to Visakhapatnam and from Sukinda (Cuttack district) mines to Paradip port should be established in the Third Plan. The development of Paradip port itself should be given top priority and the port commissioned into full use before the end of the Third Plan. For the development of scattered deposits in Keonjhar and Mayurbhanj districts it is also necessary to connect Dumaro and Banaspani (Keonjhar district) with Talcher by rail. This is particularly important for the establishment of low-shaft blast furnace near Talcher coal-fields and for the proposed new steel plant in Orissa. This connection will also facilitate the movement of ore from these areas to Paradip and Visakhapatnam. Further, the general inadequacy of all-weather surfaced roads, and roads connecting mines to main roads and railhead, needs to be remedied in Orissa in the shortest possible time, as otherwise the growth of mining industry in the State is certain to be seriously hampered.

Mechanization of Mines

6.72 The existing methods of iron ore mining have to be improved to bring about large scale development of minerals output which is necessary in Orissa during the present decade. The operations must be mechanized through a planned programme over the next five years or so. Substantial foreign exchange will have to be provided for this purpose but it will be repaid several times, through large and regular exports of iron ore, which mechanization alone can make possible. While the existing mines should undertake planned mechanization to avoid sudden disbanding of a large number of workers, no new mines should be established without adequate mechanization.

6.73 In view of the vast mineral resources of Orissa and the need for large scale development of mining in the State, mechanized exploitation should be encouraged in case of all the minerals generally, and for coal, manganese, chromite, bauxite, limestone, china clay and fire clay in particular.

6.74 Matured development of mineral resources of Orissa is also hampered for want of scientific data relating to the areas of occurrence, the extent of reserves, and the quality of a number of minerals such as chromite, bauxite, vanadium, china clay, fire clay, kyanite, ilmenite, sillimanite, beryl, titanium, etc. Surveys and scientific investigations to ascertain these should be begun without delay and completed by the end of the Third Plan. For this purpose the Mining and Geological Department of the State Government should be strengthened. Immediate arrangements should be made with the Geological Survey of India to begin and complete the investigations quickly with technical assistance, if necessary, from international organizations and appropriate agencies of foreign governments. Continuous assessment and analysis are necessary even in the case of major minerals, e.g., iron ore, manganese, coal and limestone, which are now being worked extensively in the State.

Scientific Research and Intelligence

6.75 In order to exploit the low grade deposits of several minerals, scientific research to establish beneficiation processes is required. The State Department of Mining should take up specific problems with appropriate research institutions and disseminate the findings of research for the use of prospective entrepreneurs. Similarly, the department should also organize an effective minerals information service and in regard to minerals ensure prompt dissemination of all technical and economic data relating to known minerals of the State through suitable brochures, occasional papers and special reports.

Productivity

6.76 Improvement in techniques of production through mechanization will, no doubt, raise the existing low labour productivity in the mining industry of Orissa. However, poor health standards of workers also reduce productivity. Mine-owners should, therefore, be advised to supply to the workers anti-malarial drugs and vitamin tablets at cost price, and to run canteens where cheap nutritious food may be readily available. These measures are likely to be particularly effective in raising labour productivity to an appreciable extent.

Absenteeism

6.77 The seasonal and migratory character of the mining labour in Orissa gives rise to high absenteeism and lowers the output. This problem can be partially tackled if small townships are created near mining areas, equipped with reasonable amenities of housing, water supply, sanitation, health and education, and shopping. This will attract a more stable type of labour force to the mining industry; and in course of time only a small proportion of workers will leave their jobs in mines to look after their farms.

Mining Leases

6.78 The large scale development of Orissa's mining industry to be achieved over the present decade, may not be wholly possible through mechanization of mines. In the initial period, foreign exchange to the extent required may not be available, and the progress in mechanization may not be rapid. To meet this situation, it has been suggested that more extensive working of the existing leases may be allowed, particularly in the case of coal, manganese and limestone areas, to the extent necessary. This would call for a reconsideration of the present policy under which only intensive development of existing mines is permissible. But unless the large foreign exchange required for mechanization of mines is made available and the equipment can be readily purchased, this policy is likely to cause serious shortages of minerals and fuel required by the industries.

Entrepreneurship and Capital

6.79 In Orissa, local entrepreneurship is scarce relative to the demands of large scale development of the State's mineral resources. The local capital is both inadequate and shy. Moreover, the Industrial Policy Resolution of the Government of India has reserved the development of all major minerals for the public sector. Thus the scope for private enterprise to participate in the vast development of mineral resources over the present decade is severely restricted. It is, therefore, necessary that the Orissa Mining Corporation—a joint enterprise of the State and the Central Government—undertake mining operations in a big way without delay. This is the only way to ensure rapid and large scale growth of mining activity in Orissa, which is so necessary for the fulfilment of all-India targets of minerals and industrial development, as well as of export trade and foreign exchange earnings in the future Five Year Plans. This will also place the Corporation on a strong financial footing and endow it with the status of a live-wire development institution. However, in 1958 the Corporation had mined only 35,000 tons of iron ore valued at over Rs. 6 lakhs. By 1971, Orissa mines will have to produce about 26 million tons of iron ore. Even if half of this output is to come from the mines run by the Corporation, spectacular expansion will have to be undertaken by the Corporation. The Corporation will also have to develop other minerals—manganese, chromite and bauxite. It is, therefore, necessary that the State and the Central Government give their immediate attention to the organizational and policy aspects of mineral development in Orissa. To the extent that this development may appear too big to be managed by the Corporation, it would also be necessary to allow freer and larger participation of the private enterprise in the development of the mineral resources of Orissa.

Royalty and Cess

6.80 Currently the State Government earns about Rs. 48 lakhs a year from royalties on mineral output. If the mining output develops as envisaged in this report, then by 1971 revenue from royalties would reach a level of Rs. 2·5 to 3 crores a year, at the existing rates. Normally, therefore, there would be no need to increase royalty rates during the next decade or so, when mining output in Orissa is expected to increase rapidly and in a big way. However, should such a need arise, it would seem necessary to consider the matter carefully. The question of raising royalty rates in a period when rapid large scale development is required, bristles with difficulties, specially in relation to a large number of small mine owners, and may affect production adversely. In matters where question of development comes into conflict with the need to

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

increase revenues, it would be necessary to take a balanced view after carefully weighing the pros and cons of the situation.

Technical Training

6.81 The last but not the least in importance is the problem of supply of skilled and semi-skilled manpower for a rapidly growing mining industry. In Orissa, by 1971, some 72,000 skilled and semi-skilled workers will be required to meet the manpower needs of the mining industry. The existing supply of such labour in Orissa is severely limited. But the people of Orissa can be trained for skilled work and the State Government should organize an extensive programme of technical training so as to build up an adequate supply of skilled and semi-skilled manpower to ensure development of mineral resources of Orissa on the required scale.

CSL

Chapter 7

A Programme for Large Scale Industry

Industrial Backwardness

INDUSTRIALLY, ORISSA IS among the most backward States in India. In 1956-57, manufacturing activities accounted for 8 per cent of the total output and 7·5 per cent of the total employment in the State. The contribution of industries to income and employment was lower than the comparable proportions for all-India (16·3% and 9·8%).

7.2 The structure of Orissa's industries is inferior in that it is dominated by the unorganized cottage type of units to a much greater extent than in the country as a whole. Factory employment in Orissa was hardly 10 per 1000 population in 1958 as compared to 74 in all-India (Table 30). For every worker employed in registered factories, there were more than 18 persons employed in non-factory enterprises; the comparable ratio for India as a whole was 1: 3·8. Industrial establishments falling outside the scope of Factories Act contributed a much larger proportion (48%) of total industrial output in Orissa than in the country as a whole (18%).

Low Productivity

7.3 On an average, a worker employed in industrial activities in Orissa produces a net output valued at Rs. 540 compared to Rs. 1,170 in all-India. The relatively low average output for industrial worker in Orissa is due in part to the predominance of non-factory sector in which the average product per worker is generally much smaller than in factories. The net output per worker both in factory and non-factory sectors in Orissa (Rs. 1,500 and Rs. 490 respectively) is lower than the corresponding national averages (Rs. 2,100 and Rs. 790).[1]

Structure and Growth[2]

7.4 In 1956-57 about 40 per cent of the total employment in factories was in agriculture-based industries, of which textiles and rice mills were the most important. Forest-based industries employed 26 per cent of the factory workers with proper manufacture as the largest in the category. A little over 12 per cent of the factory workers were in mineral-based industries, consisting mainly of cement and ceramics. Engineering and metal-based industries accounted for somewhat less than one-eighth of the factory workers. Chemicals and livestock-based industries were comparatively small, together engaging barely 1 per cent of the factory workers. The remaining workers were employed in miscellaneous industries, such as ice factories, printing, dyeing, electric power supply, etc. (Table 31)

---

[1] Figures for 1956-57.

[2] Discussion relates to industries covered by Factories (Regulation) Act.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GL

7.5 The composition of factory industry in Orissa differs markedly from that in all-India. While agriculture-based industries (including textiles) constitute the largest group, their share in total employment is very much smaller in Orissa. On the other hand, both forest- and mineral-based industries figure much more prominently in the State's industrial structure. This is not surprising, for it reflects the type of industrial raw materials available in the State. The relatively low proportion of employment in engineering and chemical industries is consistent with the industrial backwardness of the State. Both these industries are technologically more complicated and require a high order of skills and, therefore, belong to a more advanced phase of industrial development than has been attained in Orissa. (Table 31)

TREND OF INDUSTRIAL DEVELOPMENT

1950-51 to 1956-57

7.6 Judging by the percentage increase in factory employment, industrial development in Orissa during the last decade has been very rapid. Between 1951 and 1957 employment in registered factories increased by 34 per cent as against 19 per cent in India as a whole. The largest percentage increase (196%) was in mineral-based (non-metallic) industries, almost entirely on account of the establishment of a new cement plant. Although the proportionate increase in employment in textiles was lower (83%), in absolute numbers it accounted for the largest increase. Employment in engineering industries, including workshops rose by 71 per cent during this period. Only forest-based industries registered a decline in employment, but this was due entirely to contraction in the *bidi* industry (Table 32).[1] It is significant that during this period there was also an appreciable rise in the net output per worker. Between 1951 and 1956, the increase in Orissa was about 25 per cent (from Rs. 1,200 to Rs. 1,500) as against 12 per cent in all-India.[2]

1956-57 to 1960-61

7.7 The rate of growth of output during the Second Plan period has been even higher. Thus compared to the 58 per cent increase in net value of factory industry during 1950-51 and 1956-57, the estimated increase in the following four years, i.e., 1956-57 to 1960-61 is about 375 per cent(from Rs. 4·84 crores to roughly Rs. 22 crores).

7.8 Of greater significance is the change in the structure of industries which has started during this period. More than 80 per cent of the increase in output between 1956-57 and 1960-61 was derived from mineral-based industry whose share in total factory employment rose sharply from 12·5 per cent to 31 per cent (Table 32). The most important development responsible for this trend is the establishment of the Rourkela Steel Plant. The investment in this plant up to 1961 is about Rs. 150 crores—nearly two-thirds of the estimated total industrial investment (Rs. 234 crores) during the decade 1951–61. When the plant is worked at full capacity (viz., 1 million tons), the net value of its output would be Rs. 24 crores. However, by the end of the Second Plan, the output is expected to be no more than one-fourth of the rated capacity. Even so, it would account for nearly 40 per cent of the increase in industrial output during the period 1957–61.

---

[1] Strictly speaking, *bidi* industry is not a factory industry. All units producing *bidi* regardless of their size and whether or not they use power are covered by the Factories Act. The bulk of *bidi* manufacture takes place in houses on a contract basis; only part of it is done in regular establishments. A decline in employment in industry as recorded under the Factories Act thus refers to the employment in the regular establishments only.

[2] The Census of Manufacturing Industries data also reveal a substantial increase. In Orissa value added per worker increased by about 230 per cent between 1946 and 1955. In comparison it increased by only 70 per cent in India as a whole.

7.9 Other major developments in the mineral-based industries have been the expansion of cement and ceramic industries and the beginning of new lines of manufacture, viz., aluminium and ferro-manganese. In addition, there has been significant growth in such non-mineral industries as paper and engineering.

7.10 These developments and in particular the setting up of the steel plant mark a major step towards exploitation of the State's rich mineral resources for industrialization. In course of time it would provide an impetus for the growth of metal-based and chemical industries which would diversify and greatly strengthen the State's industrial structure.

7.11 The high rate of industrial development in Orissa is in considerable measure due to the fact that it started from a low base which tends to exaggerate the real magnitude of the achievements. The State's share in the country's industrial output was 0·26 per cent at the beginning of the decade; by 1961 it increased to only 2 per cent. The State's per capita income in 1960-61 is expected to be Rs. 212 compared with Rs. 325 estimated by the Planning Commission for India.[1] These comparisons clearly show that even in 1960-61 there will be a considerable leeway between the levels of economic development in Orissa and the country as a whole.

NATURAL RESOURCES

7.12 In an under-developed region where agriculture is by far the most important means of livelihood economic growth occurs through a rise in the productivity levels in agriculture and an expanding industrial sector. The latter process depends on many factors, amongst which development of natural resources in the initial stages of industrialization is of primary importance.

7.13 Orissa has large deposits of iron ore, manganese, coal and limestone. Sizable deposits of bauxite are also reported. Besides these the State has other minerals also, such as, chromite, dolomite, china clay, etc. As would be seen from the table below the current rate of exploitation in relation to the reserves has been very low.

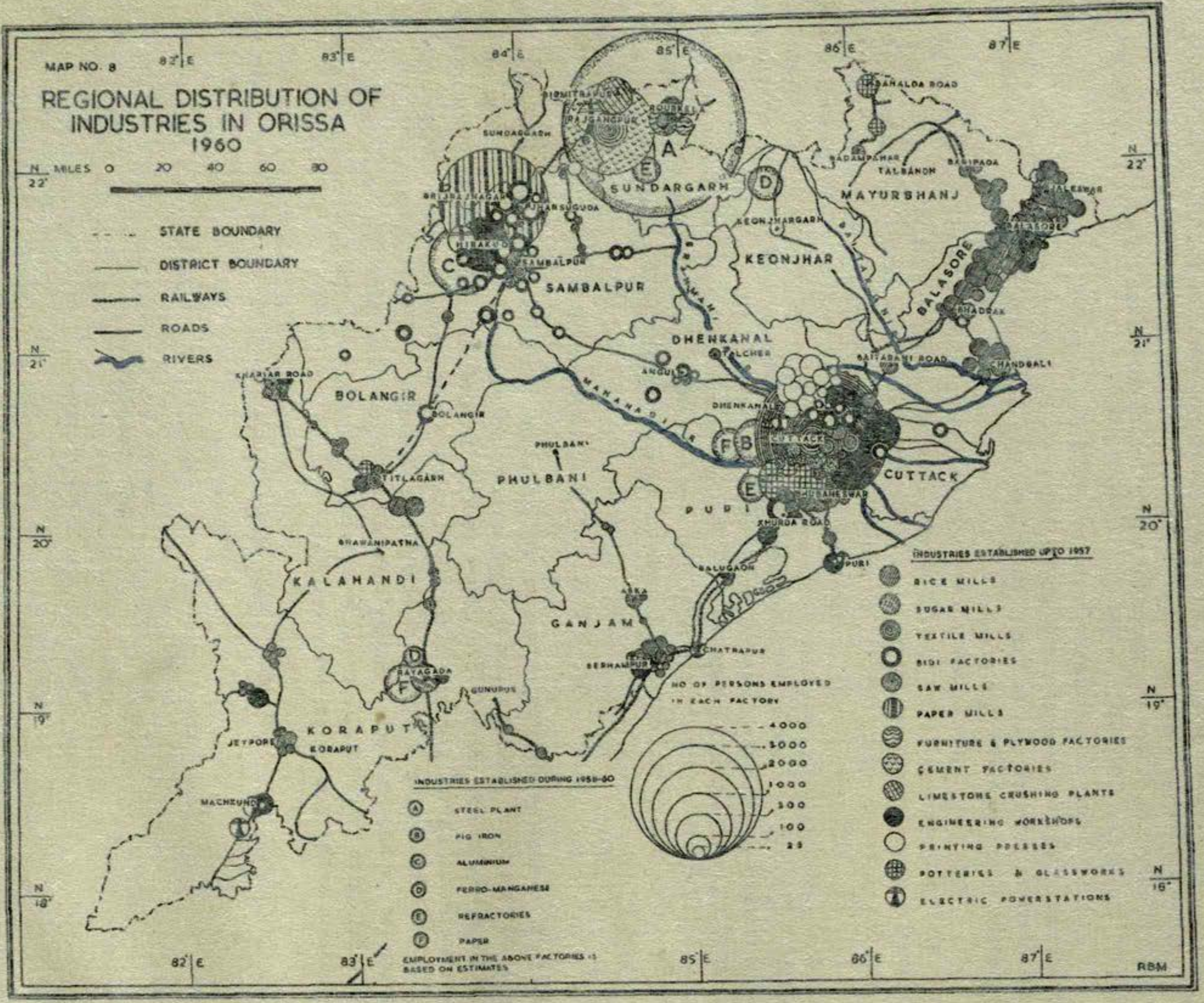
IMPORTANT MINERALS

(Million tons)

	Current Output (1958)	*Reserve*	*Industries for which utilized*
Iron Ore	2·164	1906 (Proved) 8000 (Possible)	Iron and steel
Manganese	0·286	42 (Proved)	Ferro-manganese and steel
Coal	0·516	131 (Proved)	Fuel, iron and steel and base for several chemical industries
Limestone	1·658	10 (Proved) 300 (Possible)	Cement, iron and steel
Fire clay	0·021		Refractories and pottery
Bauxite	Nil	0·2 (Proved)	Aluminium

---

[1] After adjusting for population growth at 2 per cent per year.



MAP NO. 8

REGIONAL DISTRIBUTION OF INDUSTRIES IN ORISSA 1960

7.14 Moreover, most of the mineral output of the State is exported for processing in other parts of the country. It is, however, apparent from the table that the State has resources sufficient to support a very large expansion of mineral-based industries within its territories.

7.15 Besides minerals, the State has also large potential resources in forests and agriculture which can be harnessed for its industrial development. Over two-fifths of the State's geographical area consists of forests. A sizable portion of these is hardly exploited at present and even those areas that are, have a low level of productivity. The development policy envisaged by the Forest Department would, if vigorously implemented, add greatly to the richness of this resource. While the full results of this measure would not be realized for several decades, it should be possible to double the output of timber and bamboo—the two major industrial raw materials of forest origin—in the course of the next decade. The present output of these materials and quantities likely to be available by 1971 are shown in table below:

IMPORTANT FOREST MATERIAL

	Current Output (1958)	*Potential (1971)*	*Industries for which utilized*
Timber (round)	10·5 million cft. or 210,200 tons	21 million cft.[a] or 420,400 tons.	Saw mills, furniture, building fixture, etc.
Bamboo	47·8 million cft. or 478,000 tons	75-80 million cft. or 750,000 to 800,000 tons.	Paper and board

[a] A rough estimate based on the expected increase in the net value of forest output at constant prices (See Chapter 4).

7.16 Orissa's agricultural resources which at present support nearly 40 per cent of its industrial employment will continue to grow. It is estimated that if all the measures suggested in this report were implemented during the Third and Fourth Plan periods, the State would increase its output of rice and other cereals by almost 2 million tons, oilseeds by 0·15 million tons, sugarcane by 2·7 million tons and jute by 0·5 million bales. (Table 16)

7.17 Earlier it was shown that the major part of industrial growth in the past few years has been based upon mineral resources. The brief description of these resources given above clearly indicates that there is ample scope for the continuation of this trend. Moreover, the products of such metallurgical industries as iron and steel, aluminium and ferro-alloy based on minerals available in Orissa are essential pre-requisites for industrialization of the country as a whole and would need to be produced not only in the State's interest but in the national interest as well. These two factors constitute the basis for envisaging a substantial growth of industries in the next decade.

DEVELOPMENT PROGRAMME FOR 1961–71

7.18 Based on an appraisal of natural resources, pattern of development in India as a whole, demand projection for industrial products and locational advantages offered by Orissa, a list of specific large scale industries which can be set up in Orissa during the period 1961–71 is given in Tables 36 and 37. These proposals involve an investment of about Rs. 540 crores and would

CSL

give rise to an increment of roughly Rs. 142 crores in the net annual output of large scale industry.

7.19 Since it is not possible to envisage all feasible lines of development over a ten-year period, especially in the case of non-resource-based industries, some new industries not included in the list are also likely to develop. Furthermore, expansion in certain existing agriculture-based industries, such as textile and various kinds of processing of farm produce, has not been considered. With increasing farm output and growing population these industries are likely to expand and would no doubt absorb some additional investment. Taking these possibilities into account, the total investment expected to go into large scale industry in the State during the decade may be taken very conservatively at Rs. 550 crores; the corresponding net output is estimated at Rs. 146 crores and additional employment opportunities at 90,000. A summary of the investment required, employment likely to be created and net output generated by categories of industries is given in Table 33.

Phasing

7.20 Roughly a quarter of the investment suggested for 1961–71 would take place in the Third and the remainder in the Fourth Plan (Tables 34 and 35). As against this, a little over 40 per cent of the value of net output envisaged for the decade would accrue in the Third Plan. Roughly the same proportion of the total power supply necessary for the entire programme will be required in the Third Plan. The discrepancy between the Third and Fourth Plan proportions of investment, on the one hand, and value of net output and power requirement on the other, arises mainly on account of the lag between investment and the actual realization of full output. While all the investment in Rourkela Steel Plant has been completed in the Second Plan, major portion of the output will be realized only in the Third Plan. Hence the apparently low incremental capital-output ratio (2·5:1) for iron and steel industry during the Third Plan. In the Fourth Plan when the proposed Bonaigarh Plant may be commissioned, the incremental capital-output ratio would be 5·5:1. (Tables 36 and 37)

Source of Investment

7.21 Of the total investment of Rs. 538·6 crores envisaged in large scale industry[1] for the decade 1961–71, Rs. 450 crores or about 83 per cent would be in the public sector. All of this investment would be in the iron and steel industry. Compared with the Third Plan, industrial development in the Fourth Plan would depend more heavily on the public sector. It would have Rs. 370 crores or 82 per cent of the total public sector investment for the decade and while the public sector investment in the Third Plan would constitute 58 per cent of the total investment, the proportion would be 92 per cent in the Fourth Plan.

7.22 This sudden increase in the share of public sector in industrial investment in the State is due to setting up of a new two million tons steel plant. In the succeeding Plan period this steel plant would provide impetus to the growth of several other industries and unless a bigger steel capacity or an equally capital-intensive industrial venture is undertaken by the Central Government, the share of the public sector in the industrial investment in the State is likely to fall again.

---

[1] This excludes an investment of Rs. 11·35 crores in the private sector over the decade, which has not been phased in Tables 36 and 37. If this is included, the public sector share would be roughly 75 per cent.

GSL

Broad Strategy for Industrial Development

7.23 The programme of industrial development envisaged represents a substantial increase in the rate of industrial growth. However, most of this growth will be due to the iron and steel industry which accounts for 85 per cent of the total additional investment in large scale industry and 71 per cent of the increase in its net output over the decade. By 1971 the share of iron and steel industry in total industrial output will be about 60 per cent.

7.24 Such a sharp increase in iron and steel industry represents a considerable change in the existing industrial structure. Such imbalances are, however, one of the ways in which growth is stimulated. The increased output of iron and steel which is the raw material for a large number of engineering industries, the demand for products of industries ancillary or subsidiary to iron and steel industry, the utilization of by-products for other manufactures and the increase in income generated within the region will provide impetus for growth of other industries which would in course of time tend to restore the balance in the industrial structure.

7.25 The process of adjustment may, however, not be automatic; it would require conscious planning. This is particularly so when the major development is in iron and steel industry. Engineering industries which form the principal link of this industry with secondary manufacturing as well as some of the ancillary industries need not be located in the same region. Furthermore, being localized and employing relatively a smaller number of workers (average investment per worker being as high as Rs. 1·5 to 1·8 lakhs), the impact of iron and steel industry on the growth of consumer goods industry is correspondingly small. The spread effect would be much greater if the secondary developments took place within the region. The planning decisions required to bring this about relate to the provision of necessary social and economic overheads, such as transport, power, technical education and public health facilities, as well as assistance programmes designed to encourage enterprise. The strengthening of the infra-structure of the economy through the development of these overheads and assistance programmes with a view not only to supporting the programmes of industrialization envisaged for the decade but also to promoting the growth of other secondary manufacturing industries should indeed be the strategy of industrialization for Orissa during the ten years.

Social and Economic Overheads

7.26 With this broad strategy in view, power, transport, technical education and public health facilities have been examined in detail elsewhere in this report and suggestions have been made in regard to improvements necessary over the decade 1961–71.

7.27 Here it may be pointed out that at present Orissa is lacking in transport, public health and technical training facilities. Transport—rail as well as road—is backward in the State, though on account of the low level of industrial development no marked bottlenecks were experienced by the industry in the past. With the growth of industries as envisaged, the inadequacies of the State transport facilities will show up unless forestalled by proper development.

7.28 Conditions of public health in Orissa are notoriously bad. The incidence of endemic as well as epidemic diseases is very high as a result of which the general health of the people is poor even in comparison with other parts of India. Ordinary municipal amenities such as water supply and drainage are not available in urban localities, except for a few large cities.

7.29 Skilled labour is known to be in short supply. It is estimated, for example, that the

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

training facilities for graduate engineers and diploma holders at the end of the Second Plan would be just adequate to meet half the requirement for the Second Plan. Training facilities for craftsmen, though better, are also reckoned as inadequate.

7.30 With respect to power supply, however, Orissa is better placed. The developments in the First and Second Plans have increased the installed capacity from 9·6 MW to 264 MW. Orissa has ample resources both of hydro and thermal power to meet its requirements for several decades to come.

7.31 Although the marked deficiencies in respect of all overhead facilities, except power, in the State present a somewhat discouraging picture, a great deal can be achieved through proper planning in the next decade. It is argued in this report that if the suggestions made regarding each of these overheads are implemented, the industrialization programme recommended would be facilitated and at the same time favourable conditions for further developments would be created.

Assistance Programmes

7.32 However, in spite of the availability of natural resources, economic overheads and the impetus to industrial growth provided by a large increase in the output of metallurgical industry in the public sector, it is possible that development of industries in the private sector may be tardy. This might happen on account of one or more of these reasons: inadequate information on matters relevant to making investment decisions, lack of technical knowledge on the part of potential entrepreneurs, bottlenecks in capital supply and the delays involved in administrative procedures. Each of these impediments could be overcome with proper type of assistance.

State Development Wing

7.33 With regard to the first two impediments, it is necessary to have organized access to technical information and expert judgment. For this purpose, there should be a development wing in the Department of Industries staffed by technically competent engineers. These engineers cannot be expected to cope with all the problems likely to arise in a period of rapid development, particularly in the basic industries. They should be able, as and when necessary, to call on the best technical advice available in the country. To this end, they should be in a position to co-opt individuals whose experience may be needed to supplement the technical knowledge of the permanent officers, as members of an advisory or consultant committee. They should also have access to a panel of consultants, not necessarily resident in Orissa, upon whose services they may count for help in specific situations.

Industrial Investment Trust

7.34 Nearly 75 per cent of the total investment in large scale industries in 1961–71 is expected to be in the public sector. A relatively small part would therefore have to come from the private sector. Considerable capital has been flowing into the State from elsewhere in the past. This flow is likely to continue and a substantial part of investment in industries in the private sector would come from this source. However, the local middle class as well as the erstwhile landlords and rulers of princely States have investible funds which could be an additional source of capital supply. This will incidentally give them a greater sense of participation in the industrial development of the State. The moneyed classes in Orissa do not have a tradition of contributing to "venture capital" and are, therefore, cautious. Insufficient knowledge of investment opportunities on their part and lack of sound enterprises with more or less assured prospects of gain are chiefly responsible for their "shyness". An Investment Trust designed to overcome these obstacles could draw the savings of many of these classes.

7.35 The Investment Trust could be set up by the Government with direct control or preferably could be sponsored by the Government with participation and indirect control. It would be an agency with qualified staff who can examine investment propositions carefully and identify the profitable ones. In this aspect of its function it could work in coordination with the Industrial Consultants' Organization. It would then accept funds from individuals for investment in these industries and would pay dividends in proportion to profits from all the enterprises it has invested in. This would more or less ensure steady dividends to the investors and would also offer scope for capital appreciation. In this manner the "risk" nature of investment in industry would be considerably reduced while prospects of profit would remain sufficiently attractive.

Government Procedures

7.36 At present governmental authority impinges on several aspects of industrial development. This necessitates a great deal of paper work in applying for licences, permits and credit and often involves considerable delays. One of the reasons for the delay is that the applicants are not familiar with the procedures involved. It is suggested that along with its other functions the Industrial Consultants' Organization should offer guidance with respect to these procedures with a view to cutting down the time wasted. On its part the Government also should make an attempt to simplify procedures and expedite the handling of papers related to industries.

Large Scale Industry, 1961–71

7.37 With the help of the measures suggested here and elsewhere in this report it would be possible to implement the programme of large scale industries recommended in this chapter. As a result, the net output of large scale industry would increase from about Rs. 22·1 crores in 1961 to Rs. 179·4 crores in 1971 or by 710 per cent. This rate of growth though apparently not very different from the one achieved during 1951–61 is in reality significantly higher. Growth rate of factory industry till 1956-57 was about 10 per cent per year in spite of a very low base. This rate shot up to about 94 per cent per year between 1956-57 and 1960-61, mainly on account of the Rourkela Steel Plant. The rate of growth during 1951–61 was thus about 61 per cent per year. On account of the rapid rate of growth during the three years preceding 1960-61, the total net product of factory industry in 1960-61 was much higher (over 600%) than the net output in 1951. The growth rate of 66 per cent per year for the decade 1961–71 on a larger base thus signifies a much greater progress than was achieved in the previous decade.

7.38 Employment in large scale industry in 1971 would be roughly 165,000 or 120 per cent higher than the 1961 level. Output per worker would stand at roughly Rs. 10,000 as against Rs. 3,000 in 1961 and would compare favourably with the figure in most industrialized States of India.

Chapter 8

Large Scale Industries with Scope for Development

In the previous chapter a broad strategy of industrial growth was outlined and a number of large scale industries were suggested for development during 1961–71. It was estimated that an investment of about Rs. 550 crores would be required for this programme. In this chapter new industries as well as the existing ones with potential for development are briefly discussed. The question of regional dispersal of industries is also examined.

AGRICULTURE-BASED INDUSTRIES

8.2 In 1956, agriculture-based industries constituted the largest single group in the State, accounting for over 40 per cent of the average daily employment in all factories. Textile industry was the most important industry with 58 per cent of employment in this group, followed by food processing industries with 41 per cent of employment.

8.3 Cotton textile industry in Orissa, though employing a larger proportion of factory workers than any other single industry in the State in 1956, still formed an insignificant part of textile industry in India as a whole. Thus in terms of value of output, it produced only 1 per cent of the output of Bombay and one-sixth of the output of Delhi. It ranked eleventh among the States where textile industry had any stature.

8.4 A major part of the output of textile industry consists of woven goods; yarn forms only 14 per cent of the total value of output. The cloth produced, mainly grey or unbleached, is wholly of the coarse variety.

8.5 The growth of the industry has been somewhat uneven. Value added by manufactures which was Rs. 30·56 lakhs in 1950, increased to Rs. 85·3 lakhs in 1953 and then fell to Rs. 81·2 lakhs in 1956. Employment increased steadily from 2,220 in 1950 to 5,125 in 1956 with the result that the value added per worker was fluctuating during this period and reached the lowest level in 1956. The largest increase in output, about 100 per cent over 1950 level, was achieved in 1951 and the highest level of value added per worker (Rs. 2,435) was also reached in the same year.

8.6 Demand for cloth has been rising with the growth of population and will rise more sharply during 1961–71 as the increase in per capita income becomes more pronounced. This should undoubtedly give an impetus to cloth production. However, recent growth of the industry has been halting. During the past few years licences for establishing four new units and expanding two existing ones were granted. While expansions have been undertaken, only two of the four new units are expected to come up. In the future too, though some development, especially in the powerloom sector, would undoubtedly occur, substantial growth of industry cannot be expected mainly on account of the relatively meagre prospects of growing cotton in the State and the comparative locational advantages enjoyed by other regions in the country.

Food Processing Industries

8.7 Of the food processing industries, rice milling is by far the most important. In 1956, it contributed 5·5 per cent to the value added by the industry in India. Viewed against the fact that Orissa produces nearly one-eighth of the country's rice output, this proportion is small and reflects the relative insignificance of mechanical processing. The Rice Milling Committee has estimated that nearly 90 per cent of Orissa's output is hand-pounded.

8.8 Until a few years back a large part of rice milling in the State was done on contract for customers. Most of the owners of rice mills were providing processing service only. The character of the industry has now completely changed; rice mill owners, as a rule, are participating directly in trade. In 1954 nearly half the output of the industry was on account of contract work; in 1956, the proportion had declined to 1 per cent. With this change the industry would be in a better position to take advantage of the increase in the output of rice, which is expected to be of the order of over one and a half million tons by 1971, rising demand for milled rice in urban areas and increased export trade. Regarding the last possibility it might be pointed out that at present Orissa exports a large quantity of rice in husk which could very well be milled before export. But the scope for this would be somewhat limited if Calcutta and Bihar continue to remain the main export markets. The demand in these markets is largely for boiled rice for which the people seem to have a marked preference. However, the habits of the people in this respect have shown some change and a study to find out the extent to which milled rice can substitute hand-pounded rice in these markets would be of considerable value.

8.9 Oil crushing, distilleries and breweries are industries of very little significance in the State. In 1956 oil crushing industry was actually declining and the other two were more or less stagnant. Much of the oil is still being extracted in village *ghanis*. A shift in favour of mechanical processing is, however, likely with growth of industrialization and urbanization in the State. Increase in the production of oilseeds estimated at 150,000 tons by 1971 would also assist in this process.

Sugar Industry

8.10 There were two sugar mills in the State in 1956. Neither was reported to be doing well. During the Second Plan it was decided to set up four cooperative sugar factories. Of these only one has been established at Aska in Ganjam district. The growth of the industry has been hampered, among other things, by low sucrose content of the sugarcane grown in Orissa.

8.11 Though the average yield of sugarcane per acre (36,700 lbs.) in the State compares favourably with the average for the country (26,000 lbs.), the sucrose content of the indigenous sugarcane is relatively poor (8% as compared with 10 per cent in Uttar Pradesh, 11% in Andhra Pradesh and 11·5% in Maharashtra). Since the control on sugarcane price makes the cane price uniform throughout the country, sucrose content of the cane, and the rate of sugar recovery are much more important from the industry's point of view. This factor gives to other States a comparative advantage over Orissa in the economics of sugar production.

8.12 The future prospects of the industry in the State would improve considerably if the sugar content of the cane is raised by adopting improved techniques; or, alternatively, the price of cane as a matter of national policy is linked with the sugar content. What is required at present is to demarcate those areas in the State where a high yield of sugarcane can be obtained and where, by proper cultural practices, the sugar content of the cane can be raised. If necessary, experiments should be carried out with this end in view.

8.13 It has been estimated elsewhere in this report that an additional 3 million tons of sugarcane would be produced in the State by 1971. Part of this increase would be utilized for manufacturing gur—a commodity in which Orissa is at present deficient. The two sugar factories existing in the State in 1956 and the four cooperative factories licensed during the Second Plan period, if set up, can absorb a large part of the increase in output of sugarcane. All efforts should therefore be made to improve the quality of the local cane, so that the existing as well as new sugar factories can be worked as economic units.

LIVESTOCK-BASED INDUSTRIES

8.14 The only livestock-based industry of any significance in the State is tanning. In 1956, there were 4 units which were registered under the Factories Act. Dairying is only in a rudimentary stage of development. Some of the raw hides and skins produced in the State are tanned locally and the remainder exported mainly to Calcutta. Tanned leather is either utilized by small and cottage units in the State or exported. There is at present no organized footwear industry in the State.

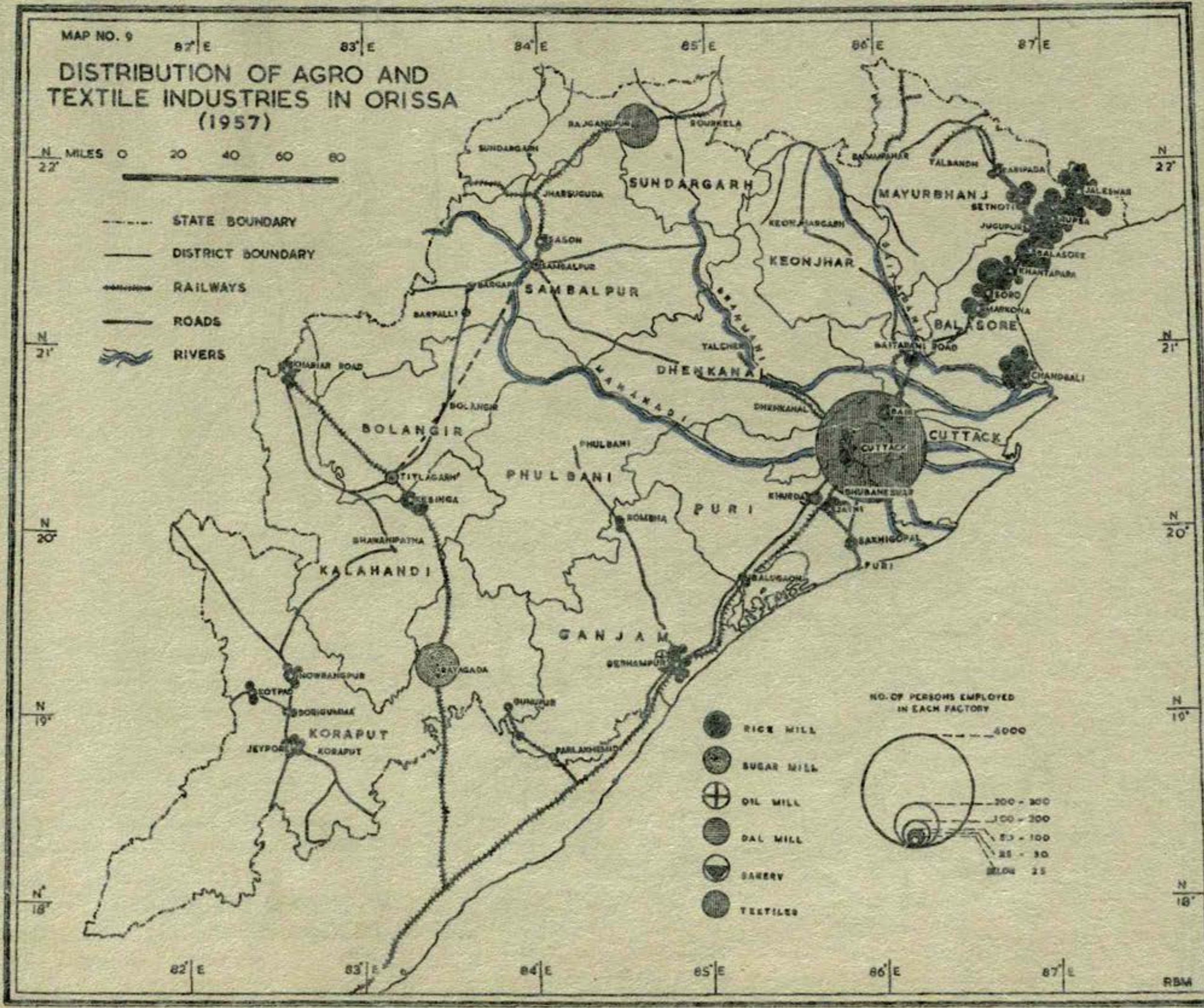
8.15 At the rate at which per capita income and urbanization are expected to grow in the State, there is bound to be a substantial increase in the demand for footwear. This would justify the setting up of one or more organized footwear manufacturing units and the expansion of tanning industry.

8.16 The first step towards the development of dairying industry must be organized collection of milk from scattered rural areas. This could be done through cooperative milk unions. Once the milk surplus from rural areas is available it could be processed by plants set up near centres of large demand. It is suggested that four plants with a daily capacity of 100 maunds of milk could be set up one each at Berhampur, Puri, Rourkela and Cuttack. These plants would roughly cost Rs. 10 lakhs.

8.17 Milk Unions would, however, function more effectively near larger towns. There would still be many villages near smaller towns where surplus milk would be available. Among these, villages in the vicinity of Parlakhemidi, Baripada, Sambalpur and Bharmapatra may be specially mentioned. It is suggested that 4 rural creameries should be established in these areas to produce such products as ghee, butter, casein and cheese. There is considerable demand for these products in the State and a part of it is currently being met by imports from other States. The creamery at Parlakhemidi could have a daily capacity of 100 maunds of milk and the other three of 50 maunds each. The total cost of these creameries would be about Rs. 9 lakhs.

FOREST-BASED INDUSTRIES

8.18 Orissa is rich and potentially even richer in forest resources. It has about 8 per cent of the total forest area in the country and about 10 per cent more of its geographical area under forests than that prescribed by the National Forest Policy. In 1958-59 output of wood in the State was about 121 million cu. ft. and included 17·7 million cu. ft. of timber. Sal, which accounts for 65 per cent of the timber output of the State, is the most important commercial species.



MAP NO. 9

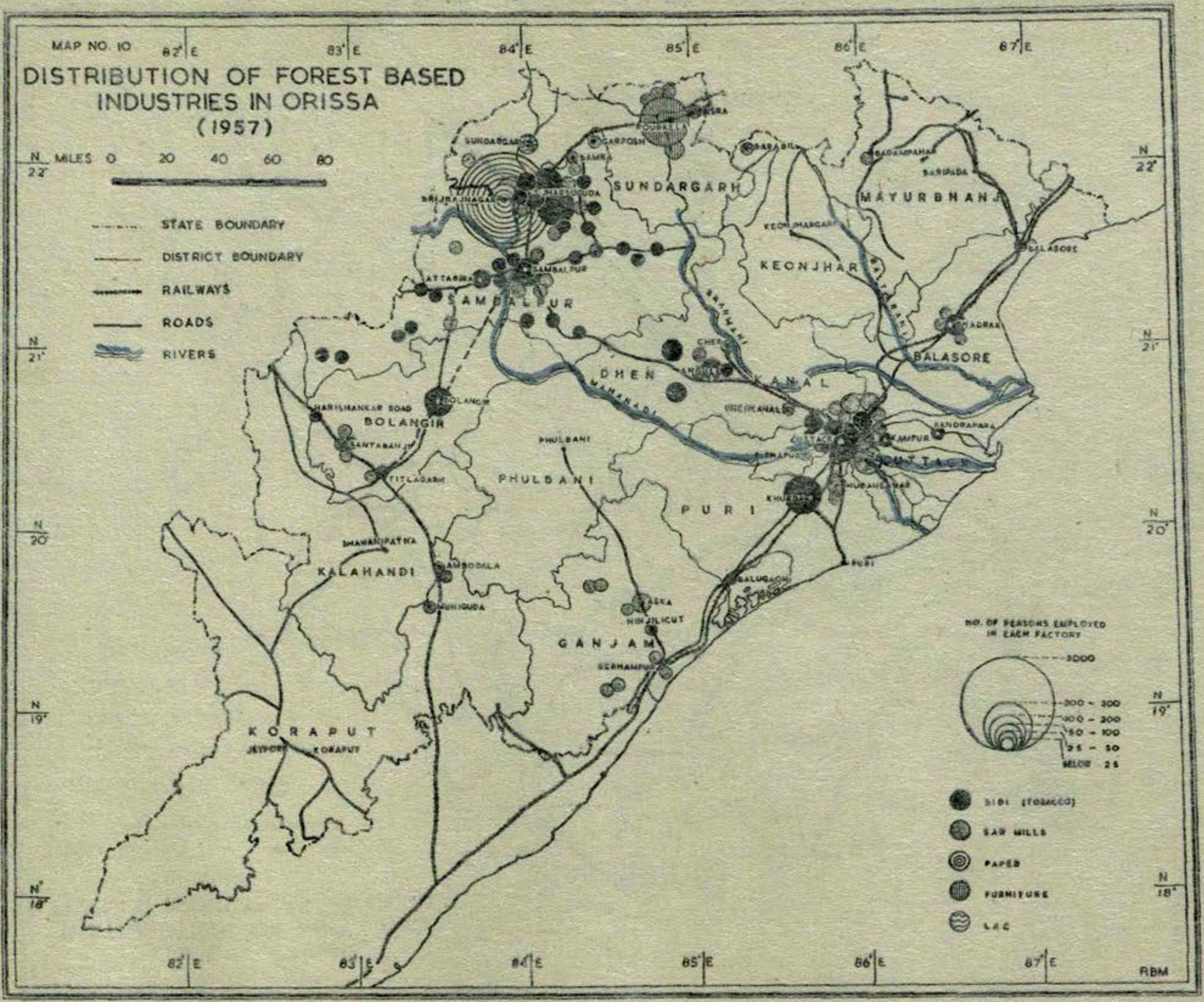
DISTRIBUTION OF AGRO AND TEXTILE INDUSTRIES IN ORISSA (1957)

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

MAP NO. 10

DISTRIBUTION OF FOREST BASED INDUSTRIES IN ORISSA (1957)



8.19 It is estimated that only 60 per cent of the forest area is covered with commercially valuable "stable forests". This offers considerable scope for afforestation to augment the timber output of the State. Moreover, on account of inadequate transport facilities the existing forests cannot be fully exploited. With the programme of afforestation and road building suggested in this report timber output is expected to increase considerably during the period 1961–71.

8.20 In addition to timber, the State has fairly large bamboo resources. At present 180,000 tons of bamboo are being extracted annually. It is estimated that from the existing forests alone, it would be possible to increase the annual output to 750,000 to 800,000 tons.

8.21 There is one paper mill in the State with a capacity of 45,000 tons of paper per year located at Brajrajnagar. Two new plants are contemplated, one at Rayagada and the other at Cuttack, with a total capacity of 36,000 tons of paper per year. In addition, the Brajrajnagar plant is planning an expansion of its capacity to 67,000 tons per year. There are 73 saw mills producing 10,000 to 20,000 cu. ft. of rough sawn timber per year. These saw mills are small enterprises using small bandsaws; none of them is equipped with a seasoning kiln or wood preservation plant. Furniture is largely manufactured on cottage scale. *Kendu* leaves are utilized for *bidi* manufacture and contribute 70 per cent of the revenue from minor forest produce. *Bidi* industry too is mostly on cottage scale.

8.22 On the basis of bamboo already available and the fact that considerable increase in the demand for paper in the country is anticipated, it is suggested that the capacity of the two paper plants expected to be set up in the State should be expanded by 35,000 tons during 1961–71.

8.23 A unit with a capacity of 6,600 tons of hard board per year using broad-leaved wood species available in the State could be established towards the end of the Third Plan. With the large scale production of urea now planned in India, urea formaldehyde resin required for particle board industry would become available. A plant to manufacture 4,500 tons of particle board per year could therefore be set up. There is also scope for establishing a paper board plant. The demand for paper board is not high at present, but it is likely to rise towards the end of the current decade. It is, therefore, suggested that a paper board plant with a capacity of 6,000 tons per year should be set up during the Fourth Plan period if the demand considerations then justify it.

8.24 It must be stressed that management of a good part of Orissa's large forest resources is not geared to their utilization for industrial purposes. It is, therefore, expected that as the husbanding of these resources improves and the forest policy is reoriented to stimulate industrial development of the State, greater scope for forest-based industries would emerge.

MINERAL-BASED INDUSTRIES

8.25 Although Orissa has one of the richest mineral deposits in the country, till recently it was not prominent for its mineral-based industries. Its mineral resources consist of large deposits of good quality iron ores, non-coking coal, manganese, chromite, fireclay, limestone, china clay and bauxite.

8.26 Development of metallurgical industries is very recent in the State. The Rourkela Steel Plant started production in 1957 and is now operating at a quarter of its installed capacity. Two ferro-manganese plants at Joda and Jeypore with a total annual capacity of 42,000 tons started production in 1958. There is one aluminium plant at Hirakud with a capacity of

20,000 tons per year. In addition, a ferro-chrome plant with a capacity of 10,000 tons and a ferrosilicon plant with a capacity of 5,000 tons have been licensed.

8.27 Industries based on non-metallic minerals have a somewhat longer history. There are two refractory plants with a total annual capacity of 134,000 tons, one cement factory with an annual capacity of 363,000 tons and two plants manufacturing glass with a total capacity of 13,000 tons per year. Recently three new plants have been licensed with an annual capacity of 100,000 tons of refractories. Viewed against the available mineral resources, and the anticipated all-India demand, there is considerable scope for further development of mineral-based industries in Orissa.

8.28 The Rourkela Steel Plant is at present producing 250,000 tons of steel against its installed capacity of 1 million tons. It is expected that over the next two or three years it will be able to produce to full capacity. According to existing all-India plans for large integrated steel works the capacity of this plant is expected to be increased to 2·5 million tons by 1971.

8.29 A recent study has estimated that the demand for ingot steel in 1971 would be over 17 million tons.[1] As against this, the supply from all the planned integrated steel works, existing and new, would be 15·5 million tons. There will thus be a shortage of over 1·5 million tons of steel in 1971. In anticipation of this shortage, production should be organized well in advance.

8.30 Orissa has the resources for a second steel plant. Its 1,700 million tons of iron ore reserves are all of good quality (over 60% iron content); Talcher coal reserves though not suitable for coking can be used for other purposes, for example, steaming, and also if scientific analysis indicates it, for blending with metallurgical coal from Jharia. The distance from Jharia coalfields to a possible site in Orissa is comparable to any site elsewhere. Adequate reserves of limestone and dolomite are also available at relatively short distances and there is abundance of water supply. In addition, other materials such as ferro-manganese, chromite, vanadium ores and graphite are all available within the State.

8.31 With the given raw material sources the most suitable site for a new steel plant would be Bonaigarh. The cost of assembling raw materials at Bonaigarh would compare favourably with that at Durgapur. Power would be available from Hirakud or the proposed thermal power station at Talcher and facilities for transporting ore and steel would be provided by the proposed rail-link between Rourkela and Talcher.

8.32 It is suggested, therefore, to set up a steel plant with an initial capacity of 2 million tons and provision for expansion to 4 million tons at Bonaigarh in Orissa. Construction work on the plant should be taken in hand early in the Fourth Plan, so that the plant can produce to capacity by 1970-71. The decision to set up this plant at Bonaigarh would depend upon the opening up of the proposed rail-link between Rourkela and Talcher. This rail-link would be necessary for transporting iron ore as well as coal to the site at Bonaigarh.

Aluminium

8.33 The present capacity of the aluminium plant at Hirakud is 10,000 tons. Steps have already been taken to expand the plant to a capacity of 20,000 tons by 1961. Known high grade bauxite deposits of Orissa are quite small (300,000 tons). However, bauxite deposits of the State have not been thoroughly prospected and the latest estimates show that considerably larger reserves are available. For the present, known reserves in the State are not adequate to supply the needs of a large scale smelter. For this reason the existing plant at Hirakud depends on Muri in Bihar for its supply of alumina.

---

[1] NCAER: *Appraisal of Steel Demand*, Council of Scientific & Industrial Research, New Delhi, 1960.

8.34 The primary location factor for aluminium industry is the proximity to a source of cheap power and not so much the nearness to bauxite. Orissa has a large potential for hydro as well as thermal power and it is expected that the power generation capacity of the State will expand rapidly enough to meet all the requirements of industrial growth in the State.

8.35 Having regard to the availability of cheap power and the fact that the country is likely to have a deficit of aluminium supply of the order of 67,500 tons by 1965-66 and 87,500 tons by 1970-71,[1] it is suggested that the capacity of the Hirakud plant should be expanded by 10,000 tons of aluminium per year by 1965-66, and by another 10,000 tons by 1970-71. In addition, a new aluminium plant with a capacity of 20,000 tons could also be set up by the end of the Fourth Plan, at Jenapur or Jajpur in Cuttack district. If in the meantime reported bauxite deposits of the State are proved and can supply the necessary raw material, aluminium industry could be strengthened and further expansion could be planned.

Ferro-Manganese

8.36 There are two ferro-manganese plants in Orissa—one at Joda and the other at Rayagada—with capacities of 30,000 tons and 12,000 tons per year respectively. A third plant with a capacity of 7,500 tons has also been licensed.

8.37 The annual demand for ferro-manganese in the Rourkela Steel Plant and the proposed Bonaigarh plant is estimated at 45,000 tons per year by 1971. The existing capacity for manufacturing ferro-manganese in the State is more or less adequate to meet this requirement. In India as a whole, too, the requirements in 1971 would be met by the capacities already licensed or currently under consideration. Any further expansion of the industry in the country would, therefore, primarily depend on export market.[2]

8.38 The States in India most favourably placed for the manufacture of ferro-manganese are Madhya Pradesh, Orissa and Andhra Pradesh. The ore reserves in these areas are of good grade. The comparative advantage of a site in Orissa or a site in Madhya Pradesh would, therefore, arise largely in respect of cost of assembling materials, and power supply. On a rough evaluation it appears that in both respects Orissa is relatively better placed. On these considerations it is suggested that the capacity of the existing plant at Joda should be expanded to 100,000 tons by 1971. This would be better than the establishment of a new unit in Koraput where manganese and limestone of required grades are also available for three reasons: (*i*) nearness to source of coke; (*ii*) proximity to consuming industries and (*iii*) the fact that expansion would require comparatively less capital investment than a new plant.

Ferro-chrome and Ferro-silicon

8.39 Orissa accounts for about 90 per cent of all-India output of chromite. Nearly all the

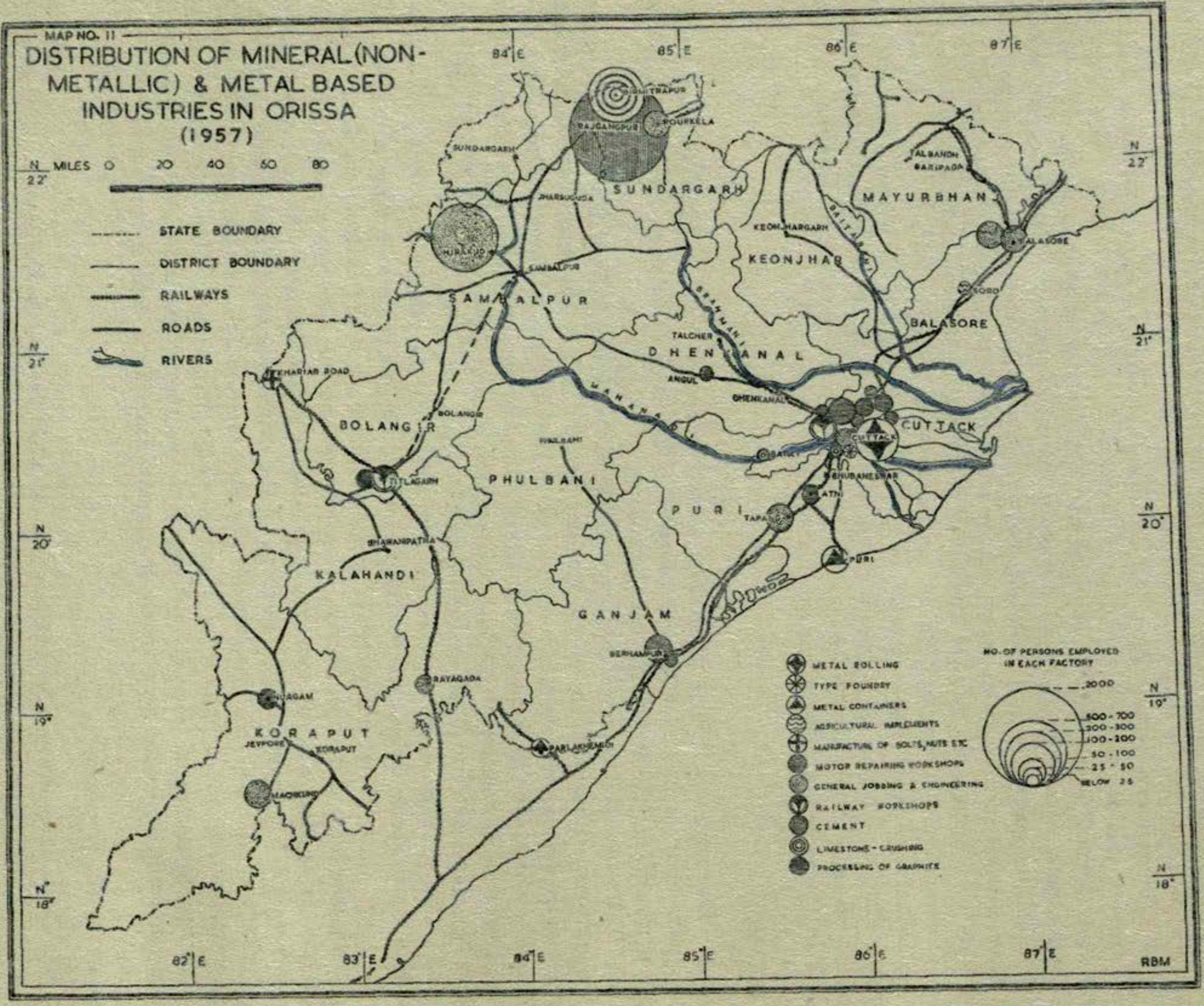
---

[1] NCAER Estimates.

[2] This is particularly true for Orissa. To meet further increase in demand for ferro-manganese after 1971, a 50,000-ton plant is already being considered for a site in Madhya Pradesh. There is a 30,000-ton plant at Garividi in Andhra Pradesh.

CSL

90



MAP NO. 11

DISTRIBUTION OF MINERAL (NON-METALLIC) & METAL BASED INDUSTRIES IN ORISSA (1957)

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

chromite produced at present is exported to the U.S.A., Japan, China and Sweden. Some chromite is, however, utilized in bichromate and refractory industries. There is hardly any manufacture of ferro-chrome.

8.40 In view of the scarcity of nickel in India, it is necessary to consider the manufacture of alloy steel with other alloying elements. The availability of adequate reserves of chromite makes ferro-chromite an obvious choice. A licence for manufacturing 8,000 tons of low carbon and 2,000 tons of high carbon ferro-chrome per year has already been granted and the plant is expected to come up either at Jeypore Road (Cuttack) or at Chowdwar. Although large deposits of good quality chromite are available in the State, no additional capacity is suggested for the present because the country's anticipated requirement of ferro-chrome for the next ten years can be met by this plant.

8.41 Ferro-silicon is largely used for producing silicon sheets required in the manufacture of transformers and motors. The Third Plan target for ferro-silicon is set at 40,000 tons; its demand is expected to rise to 70,000 tons by 1970-71. The present output in the country as a whole is only about 5,000 tons. Several licences have been granted recently for an additional output of 34,200 tons. Of this, Orissa's share is 12,200 tons. Thus another plant is needed if the estimated requirements for the present decade are to be met. It is suggested that the capacity for manufacturing ferro-silicon in the State should be increased by another 10,000 tons either by providing for expansion of the plants now contemplated or by setting up a new plant.

8.42 The demand for ferro-vanadium in the country is estimated at 50 to 100 tons per year. It is suggested that similar capacity should be installed in the already licensed ferro-manganese plant.

Refractories and Ceramics

8.43 Orissa has large deposits of fire clay and other refractory materials. But the development of refractory industry has not been commensurate with these resources. The two existing plants in the State have a total installed capacity of 136,000 tons of refractories per year or about one-fifth of the country's capacity.

8.44 The bulk of the demand for refractories is in iron and steel, glass, ceramics and cement industries and in the railways. About 60 per cent of the demand is from iron and steel industry.

8.45 Steel output in the State is expected to go up to 4·5 million tons by 1971. The demand for refractories corresponding to this output of steel would be 450,000 tons. In addition, there would also be demand for refractories in glass, ceramics and cement industries. Against this demand the existing capacity together with the currently contemplated increase would be 234,000 tons per year. It is, therefore, suggested that an additional capacity of 300,000 tons per year should be installed in Sambalpur, Keonjhar, Sundargarh and Ganjam districts during 1961–71.

8.46 The demand for ceramics, such as potteries, tiles, insulators, sanitaryware, paving bricks, stoneware pipes, etc., is rising rapidly in Orissa as well as in other parts of the country. Orissa has many good deposits of kaolin and china clay and offers considerable scope for the development of these industries. It is recommended that an additional capacity of 4,800 tons per year of H.T. insulators, 10,000 tons per year of sanitaryware, 10,000 tons per year of tiles and stoneware, and 5,000 tons per year of domesticware and L.T. insulators may be established in the State during 1961–71.

8.47 In order to set up the plants suggested above, it would be necessary to expand the State's output of clay. The deposits of Joshipur and Mayurbhanj are the main sources of clay at present. Their output would have to be supplemented to meet the anticipated requirement. For this purpose the reported deposits in other districts such as, Cuttack, Puri, Ganjam, Koraput, Keonjhar and Sambalpur should be explored and transport facilities provided for their exploitation.

Glass

8.48 There has been a substantial rise in the demand for glass and glassware in the country during the past few years and although production has been steadily rising, India still imports large quantities from other countries. The demand for glass has been estimated to reach roughly 440,000 tons at the end of the Third Plan. At this rate of increase the demand would nearly double by the end of the Fourth Plan period.

8.49 About 195,000 tons of glass was produced in India in 1959, of which Orissa's contribution was 13,000 tons. A comparison between the present output and probable demand in 1971 clearly shows that a large increase in the output of glass would have to be brought about in the country to make it self-sufficient.

8.50 While both the existing units manufacturing glassware in Orissa are currently importing most of their raw materials from other States, they are taking steps to develop local sources of supply. The State is not lacking in quartz and feldspar deposits, but a detailed survey of these resources has not been made. This should be done and if the results are favourable transport facilities should be provided to help exploitation of the resources.

8.51 On the basis of increased availability of raw material in the State, the capacity of the existing glass units could be expanded initially by 66,000 tons per year.

METAL-BASED INDUSTRY

8.52 The development of metal-based manufacturing industry in Orissa is largely a phenomenon of the past few years. Most of the units now functioning have been established after 1951. A list of these units and also of those now under consideration is given in Table 38.

8.53 Normally in engineering industries which form the bulk of the metal-based industries the cost of transporting raw materials is small in relation to value added by manufacture. This characteristic of the industry generally tends to make it market-oriented rather than to resource-oriented. In a competitive market where the quality of the product is of prime significance, the availability of a pool of highly skilled workers is also an important condition for the location of engineering industries. Large markets and supply of skilled workers are often found in developed urban centres, e.g., Bombay and Calcutta. However, in Madras and Punjab the industry has developed largely on the basis of skills and has depended for part of its sales on distant markets. The areas in which it is located are far removed from the sources of metal supply. Thus it will be seen that proximity to the source of metal supply is not necessarily a determining factor in the location of this industry. However, given the other conditions it would be an additional advantage to have it near raw material supply.

GSL

8.54 Orissa is economically one of the most backward States in the country. Till recently, hardly any development of modern industries of large scale commercial activity had taken place. Growth of urban centres and availability of overhead facilities were also considerably less than the average for the country. Orissa, therefore, had neither large markets for the products of engineering industry nor a pool of skilled workers.

8.55 In the past few years, however, the industrial structure of the State has been changing rapidly. Two of the major changes have been the establishment of a large iron and steel plant at Rourkela and the development of hydro-electric power at Hirakud. Along with these developments a number of metal-based manufacturing industries have also been established. For the future establishment of another large steel plant, increase in power supply, extension of transport facilities, provision of municipal and public health amenities, and expansion of training programme for workers are suggested in this report. With these developments the possibility of setting up several metal-based industries in the State would be greatly improved.

8.56 With the growth of industries and extensive construction activity going on in Orissa as well as in the country as a whole, the demand for producer goods manufactured by engineering industries is expanding rapidly. At the same time increasing population, rising incomes and growing urban areas are creating larger demands for durable consumer goods produced by these industries. To meet a part of this rising demand a number of engineering industries are suggested for development in Orissa.

8.57 For the following industries additional capacities are suggested on the basis of national demand: steel pipes and tubes (120,000 tons per year) at Cuttack, aluminium rolling (20,000 tons per year) at Hirakud and Cuttack, and industrial machinery (30,000 tons per year) at Sambalpur or Rourkela and near Talcher. Except for a part (12,000 tons) of the capacity for industrial machinery, other increases in capacities would be achieved through establishing new units.

8.58 In a larger number of industries the additional capacity suggested is based on regional demand and the increase in capacity is to be achieved through expansion of existing units or through multiple shifts. These industries are: structural fabrication (50,000 tons per year) at Cuttack and Rourkela; bolts, nuts and rivets (4,800 tons per year) at Panpase, Sundargarh; and C.I. pipes (7,200 tons per year) at Narangarh. It must be pointed out that the additional capacities suggested for these industries for the next ten years could be increased further if it is found possible to compete in out of State markets.

CHEMICAL INDUSTRIES BASED ON NON-MINERAL RESOURCES

8.59 The coke oven plants at Rourkela and the suggested Bonaigarh steel plant would produce a large number of by-products. Of these, coke oven gases and their products such as benzene, toluene, xylene and naphthalene would be especially important as raw materials for chemical industries. Based on these raw materials the industries which can be set up in Orissa are: styrene, polystyrene, soda ash-cum-ammonium chloride or ammonium sulphate and nitrogenous fertilizers.

8.60 The demand for styrene and polystyrene will increase with the expansion of synthetic rubber and plastic industry in the country. Immediately a demand for 5,000 tons of styrene would arise from the synthetic rubber plant now under construction at Bareilly. The demand for polystyrene moulding powder is estimated to be 3,500 tons in 1960-61. It is suggested that a plant to manufacture 10,000 tons of styrene annually should be set up at Rourkela. Of this, 5,000 tons would be required for the Bareilly synthetic rubber plant and the balance can be polymerized into polystyrene moulding powder.

8.61 It is understood that about 5,000 tons of by-product ammonia produced by the coke ovens at Rourkela cannot be utilized in the fertilizer plant for conversion into nitro-limestone on account of its chemical composition. If the investigations now in progress confirm this, it is suggested that either a plant to manufacture 14,300 tons of soda ash and an equivalent amount of ammonium chloride fertilizer or a plant to produce 19,000 tons of ammonium sulphate could be set up. Further investigations would have to be made to choose between these alternatives. Should the latter choice be made, the capacity (75 tons per day) suggested for manufacturing sulphuric acid at Rourkela would have to be raised.

Fertilizers

8.62 The present consumption of fertilizers in India is very small. The necessity of increasing it has resulted in a demand which far exceeds the present supply. Even with imports it has not been possible to meet this demand.[1] In order to cover this gap substantial increase in the capacity for producing nitrogenous as well as phosphatic fertilizers is planned on a countrywide basis. As a part of this plan the Central Government is setting up a fertilizer plant at Rourkela to manufacture 580,000 tons of nitro-limestone or 120,000 tons of nitrogen. This plant is expected to go into operation by 1962.

8.63 In view of the fact that a substantial increase in the production of phosphatic fertilizers is also required and there is scope for manufacturing super-phosphates at Rourkela, it is suggested that a plant with an initial capacity of 50,000 tons per year should be set up.

Sulphuric Acid

8.64 At present there is a small plant with a daily capacity of 25 tons of sulphuric acid at Rourkela. It is reported that this plant which utilizes hydrogen sulphide gas from the coke oven cannot produce more than 12 tons of sulphuric acid per day.

8.65 To manufacture 150 tons of super-phosphates per day, as suggested, roughly 50 tons of sulphuric acid would be required. Since the existing plant would not be able to meet this requirement, it is suggested that another plant with an installed capacity of 75 tons per day should be set up at Rourkela.

Caustic Soda

8.66 The major raw material for the manufacture of caustic soda is salt. Although Orissa is a maritime State producing salt, no chemical industry based on salt has developed. Poor transport facilities, distance from markets and relatively higher cost of manufacturing salt are chiefly responsible for this situation.

---

[1] In 1957-58, 463,000 tons of fertilizers were imported. The target of production of nitrogenous fertilizers by 1961 was 1·4 million tons. The demand for nitrogenous fertilizers is estimated at 6·8 million tons of ammonium sulphate and 8·16 million tons of super-phosphates.

8.67 The demand for caustic soda in Orissa is expected to increase with the development of industries, particularly the paper industry for which the State has excellent prospects. If improved techniques for manufacturing salt are introduced, caustic soda could be profitably manufactured in the State. It is suggested that this should be done and a plant with initial capacity of 50 tons per day set up in Cuttack or Brajrajnagar.

LOCATION OF INDUSTRIES

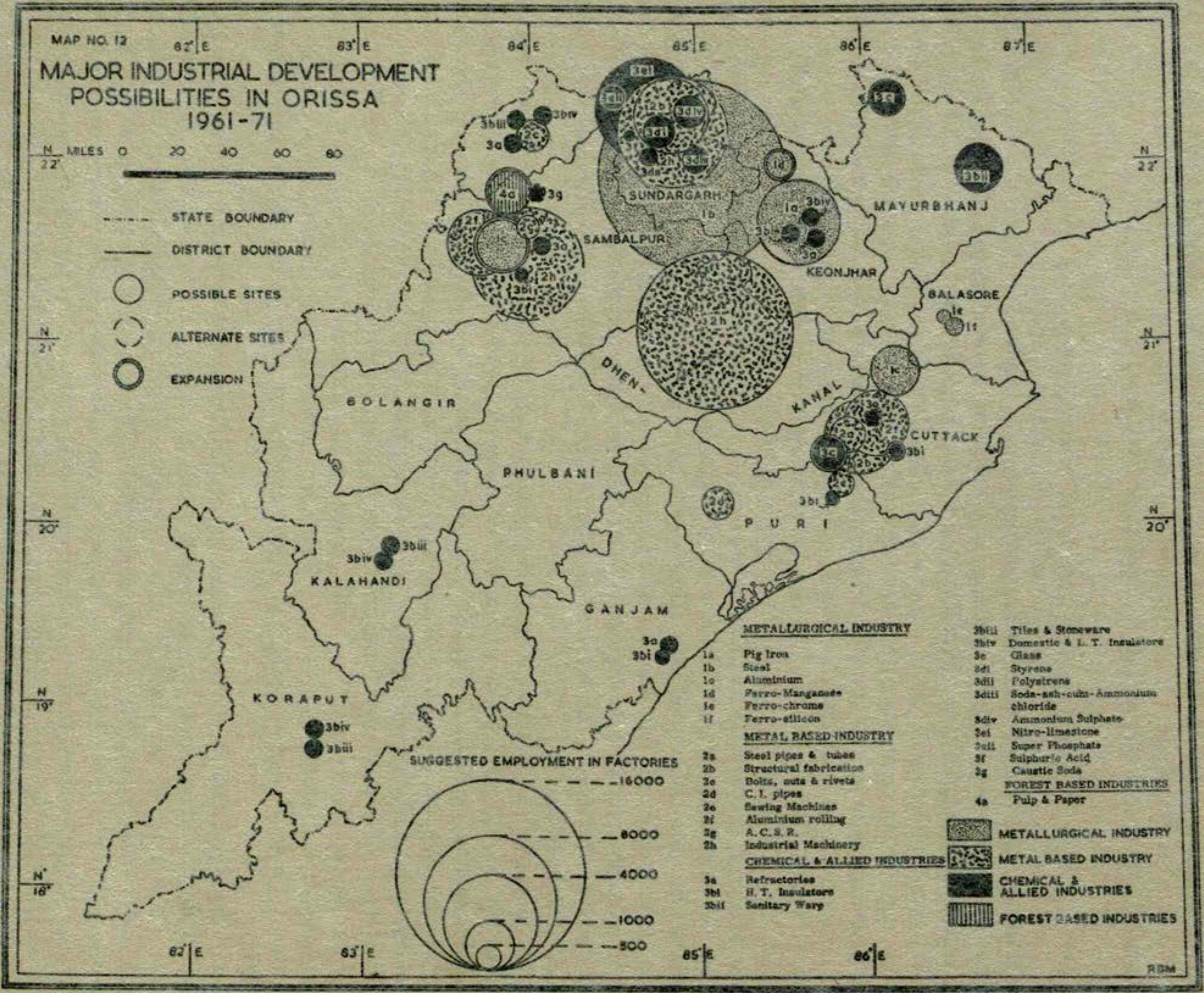
8.68 Industrial development in Orissa has been largely confined to the north of the Mahanadi (Map 8). In this region there are four important concentrations of industries: at Cuttack, in Rourkela–Rajgangpur area, Hirakud–Brajrajnagar region, and at Balasore. Each of these concentrations is distinct (Maps 9, 10 and 11). The Cuttack complex of industries is based on textiles, engineering workshops, printing presses, glass and glassware, and saw milling industries. The Rourkela–Rajgangpur complex is based on steel, cement and, to some extent, textiles. The composition of industries in Hirakud–Brajrajnagar area is quite different, with paper industry dominating supported by aluminium, engineering works, *bidi* manufacturing and saw milling. Balasore has a large concentration of rice mills and a few engineering works. It will be seen that Cuttack and Balasore which have a direct rail-link with Calcutta have mostly market-oriented industries. While the textile mills in Cuttack supply cloth to other parts of the State, the rice mills of Balasore cater mostly to export trade. The Rourkela–Rajgangpur group of industries are mineral-based, nearness to mineral resources being the main factor in their location. Besides the engineering workshops which cater mainly to the needs of Hirakud hydro power station and the aluminium plant, other industries in the Hirakud–Brajrajnagar region are forest-based.

8.69 South of the Mahanadi small scattered groups of industries, largely resource-based, have grown up. One group of industries lies along the road from Machkund through Jeypore to Bhawanipatna in Koraput district. The second group of industries lies along the railway line running through Rayagada (Koraput), Titlagarh (Bolangir) and Kharia Road in the northern strip of Kalahandi district. The third group of industries is largely concentrated in Berhampur (Ganjam) with some industries in Aska, a few miles away on the Berhampur–Phulbani Road. Rice mills, saw mills, sugar mills and engineering workshops account for nearly all the industries in this area. Some new industries are, however, now coming up in the area. These are a paper mill and a ferro-manganese plant at Rayagada, and a sugar mill at Aska.

8.70 Broadly speaking, the programme for the development of large scale industries suggested (Map 12) in this report does not materially alter the existing pattern of their regional distribution. The bulk of the investment in industries suggested would occur in the triangular area formed with Cuttack at the apex and Rourkela (Sundargarh district) and Hirakud (Sambalpur district) at the base (Table 39). Nearly three-fourths of the investment in this area would be in the Rourkela Steel Plant and the second steel plant to be located at Bonaigarh on the proposed rail-link between Rourkela and Cuttack. This rail-link which would run roughly along the Brahmani river valley would undoubtedly provide good locations for the development of many subsidiary industries connected with the two large steel plants as well as for other steel-based industries. In addition to the metallurgical and metal-based industries a number of

MINISTRY OF CULTURE • GOVERNMENT OF INDIA

CSL 6



MAP NO. 12

MAJOR INDUSTRIAL DEVELOPMENT POSSIBILITIES IN ORISSA 1961-71 chemical industries would also grow along this link as a part of the complex of industries centred around the large steel plants. Among these, fertilizers, styrene, polystyrene, soda ash and industries based on coke oven by-products would naturally be located near the steel plants, while other industries such as refractories and ceramics would find location anywhere along the railway line depending on clay resources.

8.71 The industries which are expected to grow in Hirakud–Brajrajnagar area are paper and board, aluminium, engineering, refractory and ceramics. The important resources in this area are forests and clays. In addition, power is easily available. These factors will largely determine the nature of industrial growth in this area.

8.72 In Cuttack, besides the expansion of textiles, there would be growth of engineering, ceramics, glass and such other industries as printing presses, oil and rice mills. Cuttack would perhaps continue to remain the most important centre for consumer goods industry.

8.73 In the northern districts of Mayurbhanj and Balasore and in the districts lying south of the Mahanadi, relatively small growth of large scale industries is anticipated. Development of sugar, refractories and ceramics in Ganjam district and of ferro-alloys, paper and sugar in Koraput district has been suggested. The resources of the area are the forests of Eastern Ghats, minerals, such as, manganese and clays, and sugarcane (if its cultivation can be developed in the Western plains of Koraput district). These resources would be far too inadequate to provide the base for the development of large scale industry similar to the one in the north. However, in considering the question of regional balance in industrial development, as far as large scale industries are concerned there are definite limits to their dispersal and any attempt to transgress these limits would entail economic waste. Furthermore, it is not necessary to have large scale industry in each region to stimulate economic growth. In regions where large scale industries are not possible development of other sectors of the economy such as agriculture, forests, livestock and small scale industries can provide an adequate base for economic growth. This is indeed the pattern of growth that should be envisaged for the southern districts of Orissa. But it must be emphasized that this growth would depend greatly on the provision of overheads, particularly transport and technical training facilities which are sadly lacking in this region.

Chapter 9

Small Scale and Cottage Industries

In this chapter, small scale industries comprise establishments employing up to 50 workers if using power and up to 100 workers if not using power, and which are governed by the Factories Regulation Act. All other industries comprising small manufacturing establishments whether using power or not are classified as cottage and village industries.

9.2 Orissa is a relatively backward State from the view point of industrial employment, output and productivity. In 1956-57, the proportion of the total working force that was employed in all manufacturing industries, and the proportion of the domestic net product originating in the entire industrial sector, were both lower in Orissa than in all-India. Output per worker in industry in Orissa was also low—about 2/3 of the all India average.

COTTAGE AND VILLAGE INDUSTRY

Importance

9.3 Compared with the factory industry, the non-factory industry is far more important in Orissa than in all-India. It contributes over 80 per cent of the industrial output of the State as against a little over 50 per cent in all-India. The ratio of non-factory to factory employment too is much larger (14 : 1) in Orissa than in all-India (3·8 : 1). Although more important, non-factory industries are far more backward in Orissa. The average net output per worker in these industries (Rs. 494) was lower by one-third than the all-India average (Rs. 790).[1]

Present Position

9.4 In 1951, a census of small and cottage industries covering only non-factory units was conducted in Orissa. The total number of small establishments enumerated was 137,854. Cotton textiles industry which accounted for 68 per cent of the units and 60 per cent of the total employment was by far the most important. Industries based on non-metallic minerals were next in importance closely followed by wood and wooden products industry although each category employed only about 8 per cent of the workers.

9.5 Further the census revealed that there were 224 persons engaged in cottage industry per 10,000 of population in Orissa. The proportion varied from district to district, the highest being found in Sambalpur. Compared with urban areas a larger proportion of the non-factory employment was in rural areas.

Future Growth

9.6 The development of cottage and village industries, specially the handloom sector, is being encouraged with State support. The argument in favour of this policy is that an expansion of labour intensive industries would provide the much needed additional employment and supplementary source of income to the rural people. Though the objectives of this policy are clear, it is necessary to point out that in the long run, the growth of these industries will depend not so much on government support as on basic economic factors.

---

[1] Figures relate to 1956-57.

9.7 The bulk of the cottage industries produce consumer goods, the demand for which is directly related to the level of income. Per capita income in the country according to the Planning Commission is expected to rise at the average rate of over 3 per cent per year during the Third Plan period. Even after allowing for the fact that the first charge on the additional income would be food, this would lead to a substantial increase in the demand for manufactured consumer goods. The extent to which cottage industries are called upon to meet the additional demand would depend largely on consumer's preference for their products over similar products manufactured by factory industry.

9.8 Although in different parts of the country people's preferences between products of cottage and factory industry vary widely, price and quality considerations are fundamental in influencing their expenditure decisions. Here the superior technology and organization of factory industry give it a decisive competitive advantage. The future of cottage industries, is, therefore, likely to be adversely affected by the growth of competitive factory industry and must be viewed in the wider perspective of the overall pattern of industrial development envisaged in the country.

9.9 In the formulation of the First and Second all-India Plans particular emphasis was laid on the development of energy resources, and basic and heavy industry, for the reason that their expansion would speed up the pace of industrialization. These developments are meant to act as the spearhead of growth of modernized industrial structure. Achievements so far indicate that a trend in this direction has already been started.

9.10 In the industrial structure, thus envisaged for our country, the small scale factory occupies an important place. By its size and technology, it represents an intermediate stage in the development of industry from the primitive cottage unit to the highly mechanized large scale factory. This is, in fact, the line of evolution industry is already taking in India. The introduction of powerlooms, leather stitching machines and baby oil crushers is a clear evidence of this trend.

9.11 It follows that in the future a progressively increasing proportion of the additional demand for consumer goods resulting from the rising per capita income is likely to be met by the produce of small or large factories. This will mean that the cottage and village industries would grow at a slower rate than the rate at which demand for consumer goods would rise consequently, the gap between the rates of growth of factory and non-factory industries would go on widening.

9.12 In Orissa where a big expansion in large scale capital goods industry, establishment of new industrial centres and urban growth are expected, the development of organized industries producing consumer goods would also be accelerated. It is therefore likely that the cottage industry as a whole may not grow at the same rate at which the demand for consumer goods is expected to rise.

9.13 Cottage industries which appear to have a relatively better scope for expansion are: *bidi* manufacture, hand-pounding of rice and handlooms. There is at present no mill-made substitute for *bidi*, nor is there an immediate possibility of introducing a mechanized process for their manufacture. The demand, on the other hand, can reasonably be expected to increase at least at the same rate of population growth. Milled rice has replaced hand-pounded rice in many regions in the country but in some areas of which Orissa is one, a strong preference for hand-pounded rice has held back the change. Eventually, there is no doubt, that, milled rice would be consumed in these regions also, but in the mean time increase in the production of paddy, as is expected, would lead to more rice being hand-pounded. Handloom industry is more directly in competition with factory products. Some controlled conversion of handlooms to power looms is also taking place. It is, therefore, unlikely that any substantial expansion of the handloom industry would occur except in the case of some specific products for which demand is fairly inelastic or for which there is a specialized market.

9.14 Based on these considerations an estimate of the growth of cottage and village industries in Orissa for the period 1961–71 is given below.

ESTIMATED GROWTH OF NON-FACTORY INDUSTRY IN ORISSA

	1951	*1960-61*	*1970-71*
Net Output[a] (Rs. crores)	20·05	24·5	39·20
Percentage of Net Output of all Industry	82	53	16
Employment[b] (Numbers)	385,000	430,000	525,000
Percentage of Total Working Force	7·0	6·3	6·4
Net Output per Worker (Rs.)	520	570	747

[a] See Appendices 2 and 13, and Tables 8 and 86.
[b] See Chapter 12 and Tables 61 and 66.

9.15 The net output of non-factory industry will increase by about two-thirds, although the proportion it forms of net output of all industries will go down from a little less than one-sixth. Its importance in the industrial structure of the State would thus go down considerably but there would be some increase in employment as well as output per worker.

SMALL SCALE FACTORY INDUSTRY

9.16 Small scale factory industry is distinguished from cottage industry by the higher level of technology and organization employed and the larger amount of capital invested. It is composed of factories which are registered under the Factories Act and which generally employ 10 to 50 workers with the use of power and 20 to 100 workers without the use of power.

Present Position

9.17 Small scale factory industries are a relatively unimportant part of the industrial sector in Orissa, providing only 1·5 per cent of total industrial employment. However, they constitute a significant section of factory industry. In 1956-57, 25 per cent of the total factory employment in Orissa was in these small scale industries.

GL

9.18 In 1959, there were 467 small industrial establishments in Orissa. Of these, about one-fourth were in the category of forest-based industries mainly consisting of saw mills and wood-working plants. Another one-quarter were in the metal-based industries group comprising units producing cutlery, hardware, sheet metal products, machine parts, agricultural implements, etc. Agriculture and livestock-based industries comprising flour mills, dal mills, oil mills and tanning factories accounted for 13 per cent. Of the remaining units, 34 were in mineral-based industry group, manufacturing pottery, ceramic and glassware. Thirty-nine plants in the chemical industry produced mainly such items as soap and toilet articles, colours, varnishes and household chemicals. In addition to these there were some textile mills, printing presses, automobile repair shops and so on.

9.19 The largest concentration of small factories of practically all categories is found in Cuttack. No other pronounced concentration of small factories occurs in the State except in forest-based industries in Sambalpur and Sundargarh districts.[1]

Techniques

9.20 Techniques of production in small scale factories in Orissa are generally inefficient. For example, many saw mills and wood working plants use the same type of handsaw for both soft and hardwood and as many as 60 per cent of their workers are required just for handling materials. Recovery of flour in flour mills is about 50 per cent as compared with 66 per cent in all-India, the proportion of dal nooks in dal mills is considerably higher (13% as against 2·5% in all-India) as also oil content in oilcakes (7% compared with 4·5% in all-India). Inefficient techniques of laying, curing, and tanning result in the rejection of about 25 to 33 per cent of leather as unfit for use. In all these industries considerable improvement in the quality of the product as well as reduction in cost could be brought about by introducing better machines and tools. The main difficulty in the way of doing this is shortage of finance and the absence of proper credit facilities.

Finance

9.21 Some measures have been taken by the State Government to meet the credit needs of small industry. Loans are provided for various purposes under the State Aid to Industries Act, through the Pilot Project of the State Bank and by State Finance Corporation. In addition, the National Small Industries Corporation sells machinery to small enterprises on hire purchase. Despite these facilities small scale industries still experience considerable shortage of institutional finance.

9.22 The problem arises not so much due to lack of institutions as due to inadequacy of the quantum of credit available from the existing institutions. Another limiting factor is the inability of the existing institutions to meet the requirements of the small enterprises. Within the small industry group there is a large variety in size and organization. Problems faced by the smaller size units differ radically from those encountered by the larger ones. It is, therefore, necessary to distinguish between the various categories of small scale units according to the nature of their credit requirements and to devise efficient methods of meeting them.

---

[1] *State Register of Small Scale Industries*, Orissa, 1960.

Labour

9.23 Small scale industries also suffer from the general shortage of skilled labour in the State. Most of their labour requirements are met by workers from other States particularly Punjab, Andhra Pradesh and Bihar.

9.24 Expansion of training facilities programmed for the next decade would go a long way in reducing this shortage. However, considering the big demand for technical personnel which will arise in the large scale industries it would be necessary to ensure that the requirements of small scale industries are not overlooked.

Future Growth

9.25 In view of the expected increase in demand, and the available raw materials a large growth in the small scale factory sector can be expected over the next decade.

Demand

9.26 Increase in population and per capita income expected to occur during the period 1961–71 is bound to increase the demand for several manufactured consumer goods, such as, furniture, leather goods, toilet articles, ready-made garments, etc. In addition, the rapid growth of large scale industry, transport and agricultural production envisaged, will create an increased demand for feeder and ancillary producer's goods such as agricultural implements, hand tools, engineering tools, nuts and bolts, machine screws, paints and so on, which the small scale industry can very well supply. The increase in the number of educational institutions will increase the demand for books and school accessories, and the expansion of medical facilities will raise the demand for pharmaceutical products and hospital appliances. Growth of urban centres together with improvements in drainage and sanitation facilities is likely to increase the demand for pipes, building hardware and sanitaryware. A large increase in demand for the output of several small scale industries is, more or less, assured.

Raw Materials

9.27 As regards raw materials, almost all groups of small scale industries are in a very favourable position. Orissa has a large forest area and produces both hard and soft wood, bamboo and herbs used in medicine, shellac and a variety of minor items. About 18 million cubic feet of timber is felled every year and about half of it is exported in the form of logs and beams. By setting up saw mills and wood-working plants, much of this material could be converted into industrial and consumer goods.

9.28 With the expected increase in the output of rice, oilseeds and pulses considerable expansion in the rice milling, oil crushing and dal milling industries is possible. The large increase in the output of rice straw opens up the possibility of manufacturing pulp. It is estimated that the production of raw hides, bones, horns and hoofs in the State could easily support five additional leather manufacturing units, three bonemeal plants and two by-products processing plants.

9.29 Iron ore and manganese, the main minerals of Orissa, do not offer scope for small scale industrial activity. However, graphite and china clay which are found in several parts of

GSL

the State can be the base for small scale plants manufacturing slate, graphite and ceramic products.

9.30 Orissa is rich in raw materials for chemical and pharmaceutical industries. Herbs like *bramhi*, *nux vomica*, *termuri coriander*, *serpentine* and *rowolfia* offer scope for pharmaceutical plants which can be economically worked on a small scale. Vegetable oils, linseed and groundnut are also available in the State for the manufacture of paints, varnishes, and toilet products, mollases for the manufacture of industrial alcohol.

9.31 Iron and steel is at present in short supply in Orissa as it is in India. The proposed expansion in the steel capacity in the State, however, will be able to feed a number of metal working plants. In addition, bell metal is also manufactured in Orissa, though due to competition from stainless steel and plastic, the bell metal industry is a decaying one.

9.32 Orissa is a maritime State with rich sea fisheries. In addition, it also possesses a large inland water area, well stocked with fish. Based on sea, estuarine and riverine fisheries, such small scale industries as fishcanning, manufacture of fishing equipment, nets, boats, etc., could be established.

Pilot Project

9.33. The Pilot Project launched in 1957 by the Orissa Government to assist the development of small factory industry marks a departure from the usual forms of assistance currently provided by State Governments and has good potentialities. The project offers entrepreneurs assistance upto 90 per cent of the authorized capital of a company registered for establishing a new plant. In addition, it provides technical and managerial training facilities. The management of the company is under the control of a Board of Directors consisting of representatives of the Government and entrepreneurs. It is, however, ensured that the final decisions would rest with the Government.

9.34 Within two years of the project's existence, 35 companies have come into existence. It is, perhaps, too early to assess these developments, but the number of companies floated and already gone into production (6) suggests that fair progress is being made. There is no doubt that with proper guidance the Pilot Project can be instrumental in bringing about a considerable growth in small factory industry in the State.

9.35 However, the Pilot Project has been facing some teething trouble. The most important among these arise from the fact that while the Industries Department has taken on new responsibilities it has not been able to strengthen itself appropriately to fulfil them. It is suggested, therefore, that a well qualified Pilot Project Administrator and an adequate technical staff to assist him should be appointed. The Pilot Project Administrator would help in selecting profitable lines of production and good entrepreneurs. In close cooperation with the Small Industries Service Institute he would give technical and managerial assistance to industries falling within the scheme. With his assistance some of the procedural delays could also be avoided.

9.36 The project is basically intended to assist local entrepreneurs, except in those cases where an out-of-State entrepreneur has a local collaborator. While the local entrepreneur needs to be encouraged, this policy should not be carried to the extent where either the rate of growth of small factory industries is retarded or inefficient entrepreneurs through mismanagement reduce the attractiveness of the project. It may be emphasized that the basic objective of the project should be to develop small-scale industries on efficient lines.

9.37 The State Government proposes to invest about Rs. 42 lakhs in the Pilot Project Scheme during the Third Plan. This is a most promising scheme and it is suggested that the investment should be increased to at least Rs. 1 crore in the Fourth Plan period.

9.38 An important aspect of the State Government's investment in the Pilot Project is the revenue that will accrue to the State through the profits earned by the various companies. If the State were to invest on the above scale during the Third and Fourth Plans, it should be able to get a revenue of about Rs. 15 lakhs, i.e., about 10 per cent return on investment. Considering that the State's financial resources are limited and far short of requirements, the Pilot Project which is a highly commendable scheme from the view point of industrial development should also be looked upon as an additional source of revenue.

9.39 After considering the over-all profitability, demand availability of raw materials, skills, transport and power, 92 typical small scale factory units are recommended to be set up initially in the State during the period 1961–71. Individual industries recommended are listed in Appendix 5. A summary table is however given below:

PROPOSED SMALL SCALE INDUSTRIES IN ORISSA

		Raw Material Base						
		Forest	*Mineral*	*Chemical*	*Agriculture*	*Metal*	*General*	*Total*
Types of Industries Suggested	(Number)	11	7	5	6	16	8	53
Number of Units	(Number)	18	8	6	11	32	17	92
Capital Investment	(Rs. lakhs)	63	21	21	31·5	102·5	29·25	268·25
Employment—Direct	(Number of Workers)	732	333	215	435	1,246	605	3,566

9.40 Approximately one-third of the new plants suggested are metal-based while another one-fifth are forest-based. Important among the former are a foundry and a machine shop at Rourkela, and a metal tools and cycle parts unit in Cuttack. Important forest-based plants are the five saw mills to be located in Ganjam, Bolangir, Phulbani, Dhenkanal, and Koraput districts. Of the rest, the more prominent ones are the distilleries at Aska (Ganjam district) and Asthrang (Puri); straw pulp and board manufacturing unit at Bhadrak (Balasore), and tomato canning factory in Titlagarh (Bolangir).

9.41 Total investment in the recommended new plants is estimated at about Rs. 2·65 crores and the additional employment at 3,566. The net output resulting from this investment would be of the order of Rs. 1·4 crores. Capital investment per worker in the new plants would be Rs. 7,500 as compared with the existing ratio of Rs. 1,200. The recommended small scale plants are thus more capital-intensive than the existing ones. This is partly on account of the greater emphasis on metal-based industries in the suggested programme of development, and partly because of the more developed techniques envisaged for the new plants in all groups of industries. It must be emphasized that a high level of technology must be adopted in small scale plants if they are to yield profit to entrepreneurs.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

Location of New Small Scale Factories

9.42 Table 40 gives the estimate of proposed investment in the 92 plants according to their location. It will be seen that the Cuttack–Puri region, which at present has the largest concentration of small scale factories would also have the biggest share of investment during the next ten years. Other districts where relatively large investments would be made are Balasore, Ganjam, Sambalpur, Sundargarh, Bolangir and Keonjhar. The pattern of location suggested for the new plants does not deviate materially from the pattern of existing concentrations. Industrially backward areas such as Dhenkanal, Kalahandi, Phulbani, Mayurbhanj and Koraput receive little additional investment. These areas lack overhead facilities, especially transport and cannot be regarded as appropriate sites for the factories at present. For developing these areas industrially necessary overhead facilities would have to be provided first and these must be given high priority.

Phasing

9.43 The distribution of the suggested plants between the Third and the Fourth Plans is given in Appendix 7. The criteria used for this distribution are: current demand, resources and skills at present available, ability of a large scale plant to give rise to feeder and ancillary industries as also its ability to provide relief to decaying industries or depressed areas. Of the 92 new plants recommended, 51 or more than half are for the Third Plan and the rest for the Fourth Plan.

9.44 The units suggested here indicate the type of industries that can be set up and do not exhaust all possible avenues of investment in small factory industry. Further expansion in the industries suggested may be possible in the Third Plan and in the Fourth Plan and other profitable lines of manufacture may emerge which cannot be foreseen at present. It has, therefore, been suggested that Rs. 3 crores should be invested through the Pilot Project Scheme in small industries during this period.

9.45 The construction of industrial estates is an integral part of the programme for developing small scale industries. Five industrial estates were planned—one each at Cuttack, Rourkela, Jharsuguda and Berhampur during the Second Plan. However, only the one at Cuttack was completed. It is suggested that the other four industrial estates should be set up and, in addition, an industrial estate each should also be set up at some suitable locality in Keonjhar, Puri, Balasore, Bonaigarh and Rayagada districts during the Third and Fourth Plan periods. Of these, while the others may be small, the one at Bonaigarh should be planned on the pattern of Rourkela industrial estate. The development of these industrial estates would require an investment of about Rs. 6 crores.

9.46 Government investment in small scale factory industries would thus come to Rs. 9 crores. An investment of Rs. 13·5 crores[1] may be expected in the private sector, bringing the total under this head to Rs. 22·5 crores.

9.47 For cottage industries, the amount of Government investment envisaged is Rs. 4·5 crores and together with Rs. 7·2 crores investment in the private sector, it adds up to Rs. 11·7 crores. Total Government investment in the small scale and cottage industries would thus amount to Rs. 13·2 crores and total private investment to Rs. 20·7 crores.

---

[1] See Appendix 12 for estimates of investment in Small Scale and Cottage Industries

Chapter 10

Power

Installed Capacity and Annual Generation

AT THE END of March 1960, Orissa had an installed capacity of 135·88 Megawatts (MW) in public utility undertakings and 93·42 MW in industries generating electricity for their own use. Table 41 indicates the pattern of installed capacity and of annual generation for the year 1959-60. Hydro plant comprised 54 per cent of the generating capacity and accounted for 76 per cent of the annual generation and the balance was produced in steam and oil plants.

10.2 The actual progress of public electricity undertakings in Orissa and its relationship with that for the country as a whole are indicated in Tables 42 and 43. At the end of 1950, the installed capacity in public utility power stations was only 4·6 MW and approximately 5 MW in industry-owned power stations making a total capacity of 9·6 MW. At the end of the First Five Year Plan, the capacity of public utility plants increased to 20·50 MW and of industry-owned power stations to 11·47 MW giving a total capacity of about 32 MW—about 4½ times the capacity at the end of 1950. The low installed capacity in 1950 was largely due to the predominance of agricultural occupations in the State and the industry comprised only one paper mill and a few collieries. There were very few small and medium industries. Over 70 per cent of the total electricity generated in public utilities in 1950 was from diesel power stations, and the balance from a small steam plant, with the result that tariff for electricity was rather high. Industry accounted for only 22 per cent of the total effective consumption of electricity in 1951 (Table 46). Diesel plant operated by licencees, which served major towns like Cuttack, Puri and Berhampur contributed 61 per cent of the total generation. A marked rise in the installed capacity during the First Five Year Plan indicates the beginning of change in the economy from purely agricultural to agro-industrial structure. During this Plan period (1951–56), Orissa's share in the country's installed capacity and generation rose from 0·26 per cent to 1·17 per cent and 0·12 per cent to 0·21 per cent respectively.

10.3 At the end of the Second Plan, the installed capacity is expected to increase from 32 MW in 1956 to 264 MW. This comprises 160·8 MW hydro, 12·3 MW steam, 4·7 MW diesel and 86·2 MW industry-owned plant. The hydel power is from Hirakud (123·0 MW) and Machkund, (Orissa's share 37·8 MW).[1] Orissa's share in the country's installed capacity and generation rose during 1956 to 1959-60 from 1·17 per cent to 3·51 per cent and 0·21 per cent to 3·33 per cent respectively. These large additions to generating capacity facilitated considerable development of industries in Sundargarh, Cuttack and Sambalpur districts which form a new industrial belt. This will give impetus to an accelerated demand for power. The growth of electrical load during this period has been facilitated by locational advantage for raw material based industry and the availability of cheap power.

---

[1] Chief Engineer, Electricity, Orissa.

10.4 In 1951, the generating plant installed in public utilities in Orissa was only 0·332 kW per thousand of population which was only 6 per cent of the all-India figure of 5·073 kW. The density per square mile of generating plant installed was 0·081 kW, about 5·6 per cent of all-India (1·446 kW). The electricity generated in the State for the year 1951 was 465 kWh per thousand persons, about 2·9 per cent of all-India (16,192 kWh). Thus the generation of electricity in Orissa was very small and the lowest among major States in India, thus underlining its industrial backwardness. With the commissioning of Hirakud Project and the generating plant of the Rourkela Steel Plant, the relative position has undergone rapid change, as can be seen from figures at the end of March 1960, given below:

	kW per thousand population	*kWh per thousand population*	*kW per sq. kM*
All-India	9·605	37,176	1·187
Orissa	8·322	30,726	0·871
Orissa as per cent of All-India	86·10	82·5	73·5

Pattern of Generation

10.5 The changing pattern of generation of electricity in the public utilities as between hydro, steam and diesel plants is evident from Table 44. The share of steam plant in the total generation which was over 80 per cent in 1955 was reduced to a mere 0·2 per cent in 1959-60, while the generation from hydro plant shot up from less than 0·1 per cent to 98·4 per cent. The shift in the pattern of generation was mainly due to the commissioning of the Hirakud and Machkund hydro-electric projects.

PATTERN OF CONSUMPTION

10.6 Of the total electricity sold by public electric power systems during 1959-60, industries consumed 93·6 per cent. The rest was shared by domestic light and power (3·7%), commercial light and power (1·6%), public lighting (0·3%), irrigation (0·2%) and public water and sewage pumping (0·6%). (Table 46)

10.7 The pattern of electricity sales by public utilities from 1951 to 1955 indicates that there has been a four-fold increase in industrial consumption in four years; a much larger increase (nearly 90 times) occurred during 1955 and 1959-60. Household consumption rose steadily during 1951 to 1956. It increased three times during 1956 to 1957-58 when Hirakud power became available. An overall increase in other categories of electricity consumption was noticed during the years 1956 and 1957. Virtually no electricity is being used for irrigation except a small consumption reported in the years 1955 and 1959-60 (Table 45). This pattern of consumption differs considerably from that for India as a whole (Table 47). During the period 1951 to 1957-58, the consumption pattern in Orissa changed considerably and became more and more similar to that of the country as a whole. In the succeeding years this trend was reversed. The resulting divergences are, however, in favour of increased share of industrial consumption in Orissa (India 68·4% and Orissa 93·6% in 1959–60).

10.8 The steep rise in industrial consumption since 1956 is due to the availability of cheap power from the hydro-electric projects, particularly the Hirakud project.

Per Capita Consumption

10.9 In 1951, the total per capita consumption of electricity from public utilities in the State was 0·35 kWh compared to 13·25 kWh for all-India. The per capita consumption was then the lowest amongst major States (Tables 48 and 49). Per capita consumption of 0·35 kWh comprised 0·15 kWh for domestic light and power, 0·10 kWh for commercial light and power, 0·08 kWh for industrial uses and 0·02 kWh for public lighting. Its deviation over different components for all-India was quite substantial. The reason for the low per capita consumption was the low level of industrial development, the economy being almost entirely agriculture-based with less of urbanization than in other States.

10.10 With the launching of the Five Year Plans and with the coordinated efforts made to develop power resources and industries, the annual per capita consumption of electricity recorded a sizable increase and stood at 3·97 kWh in 1957-58 compared with all-India 23·97 kWh. The progress made in this short period of six years is substantial. During the next two years remarkable progress was registered, the corresponding figure rising to 27·89 kWh (all-India 30·40 kWh in 1959-60). There is a shift in the per capita pattern of consumption. Mainly the consumption in industries has increased substantially. (Table 48)

SELF-GENERATION IN INDUSTRIES

10.11 In 1959-60, industries generating their own electricity had a generating capacity of 93,418 kW and generated 146·475 million kWh for their own use. Adding this to 501·732 million kWh generated in public utilities, the total generation of electricity in the State amounts to 648·207 million kWh. Self-generation forms 22·6 per cent of this total, as compared with 15·6 per cent for all-India. The relative position can be judged from another angle. Of the total 572·966 million kWh consumed in industry, self-generation provided 25·6 per cent and the balance was purchased from public utilities. In all-India, during the same year self generation comprised 24·7 per cent of the total electricity used in industries. The picture was, however, quite different in 1955 when Orissa had to obtain 94 per cent of her industrial electricity from self-generation (as against nearly 32% in all-India). The high percentage of self-generation in Orissa is partly due to the fact that these industries were started before electricity could be obtained at cheap rates. The relative share of self-generation would diminish progressively as the power system expands. (Table 50)

10.12 The electricity consumption pattern is somewhat different when the contribution of self-generation is taken into account, as would be evident from Table 49.

DEVELOPMENT DURING THE FIRST AND SECOND PLAN PERIODS

10.13 Prior to 1951, there was very little utilization of electricity in the State and it was only during the First Plan that expenditure amounting to Rs. 5·2 crores was incurred on the projects mentioned below. These projects were, however, actually completed in the Second Plan.

CSL

The above expenditure is exclusive of the expenditure incurred on the Hirakud multi-purpose project, which was constructed as a Central Government project.

Machkund Hydel Scheme

10.14 This envisaged construction of Jalaput Dam on the Machkund river in collaboration with Andhra Pradesh with an ultimate capacity of 126 MW and Orissa has a 30 per cent share in this capacity (that is to the extent of 37·8 MW).

Duduma Transmission Scheme

10.15 This project envisaged the laying of 132 kV transmission line from Machkund power house to Berhampur in Ganjam district via Jeypore and Rayagada with 33 and 11 kV extensions to other localities and low tension lines for the benefit of various parts of Koraput and Ganjam districts.

Hirakud Power Utilization Scheme

10.16 The scheme covered the construction of transmission and distribution lines to utilize the generating capacity of the Hirakud project which was constructed as a Central Government project. The objective of the scheme was to serve the districts of Cuttack, Puri, Dhenkanal, Sambalpur, Sundargarh, Bolangir, Mayurbhanj and Keonjhar.

Cuttack Thermal and Rural Electrification Scheme

10.17 The scheme envisaged the installation of 5,000 kW of steam plant at Chawdwar (near Cuttack). A total of about 1,000 kW of diesel plant was also commissioned.

10.18 About 70 per cent of the work on Hirakud project was completed by March 1959. Power is being fed to the Rourkela Steel Plant, Joda ferro-manganese factory, Rajagangpur cement factory, Brajrajnagar paper mills, and the towns of Bargar, Sambalpur, Sundargarh, Cuttack, Puri, Dhenkanal, etc. At the end of 1960, the public utility power systems will have a capacity of 177·8 MW and self-generating industries will have a total capacity of 86·2 MW including 75 MW of generating capacity installed at the Rourkela Steel Plant.

REGIONAL DISPARITIES WITH REGARD TO ELECTRIC SUPPLY

10.19 Industrial demands and urban demands are two of the main factors which help to make electric supply economical. On the other hand, it has been found that industries develop in places where raw materials and low cost electric supply are available. From this point of view, it would be desirable to have electric power available in all the districts. Naturally, extension of lines involves considerable capital expenditure and when there is limited availability of development funds priorities have to be allocated for extension of electric supply to locations where power demands are imminent, as compared to others where the demands are not readily forthcoming.

10.20 At present, the districts of Sambalpur, Sundargarh, Mayurbhanj, Balasore, Cuttack, Keonjhar, Dhenkanal and Puri, have transmission lines extending from the Hirakud project, Lines from the Duduma project extend to places in the Koraput and Ganjam districts (Map 13). Duduma lines are being extended to Berhampur in Ganjam district, and the Third Five Year Plan proposals include extensions into Kalahandi and southern parts of Bolangir district. The northern part of Bolangir will be served by lines from the Hirakud project. The only district which is not served by either of the above projects is Phulbani. One pilot diesel plant has been installed at Phulbani and two more plants—one at Baliguda and another at Boudh are proposed. When demands in this district grow, or if a few medium sized factories are constructed in this district, it would be possible to extend the transmission lines into this area.

RESOURCES

10.21 The State possesses considerable amount of low grade coal suitable for power generation. The coal resources are concentrated in four areas of Gondwana rocks with proved reserves estimated at 800 million tons. The fields are well served with roads. Coal seams have also been reported at many other places like Dera Deulbari, etc., which suggest the availability of large quantities of coal suitable for power development.

10.22 The State's hydel resources are evenly distributed. A preliminary estimate by the Central Water and Power Commission places the aggregate power potential of rivers flowing through Orissa at 2,875 MW at 60 per cent load factor. The bulk of the potential is located in the Sabari river and next in importance are the sites on lower Mahanadi, and upper Brahmani; there are others also: Upper Mahanadi, lower Brahmani and Baitarani (Table 51). The estimated hydro power potential of Orissa may be more than 2 million kW after allowing for the shares of other States in the potentials of inter-State rivers, such as Bihar's share in the upper Brahmani and Andhra's share in the exploitation of Sabari. The hydro potential of Orissa is adequate to meet her requirements for at least the next fifteen years. Much investigation will however, be necessary to enable exploitation of these resources to the optimum extent. No oil or natural gas resources have been discovered in the State so far.

POWER REQUIREMENTS, 1961-71

10.23 In view of the large potential resources for power, both hydel and thermal, and with the rapid development of raw material oriented industries, the demand for power is likely to increase substantially in the next decade. The Central Water and Power Commission made a load survey in 1956 and estimated the State's potential demands for power at 200 MW for 1960-61, 300 MW for 1965-66 and 460 MW for 1970-71. According to CWPC estimates, 80 per cent of the total requirements would be from four districts, viz., Sundargarh, Sambalpur, Keonjhar and Cuttack. The major part of the industrial growth has occurred in these districts and the above figures were subsequently revised on the basis of fresh information.

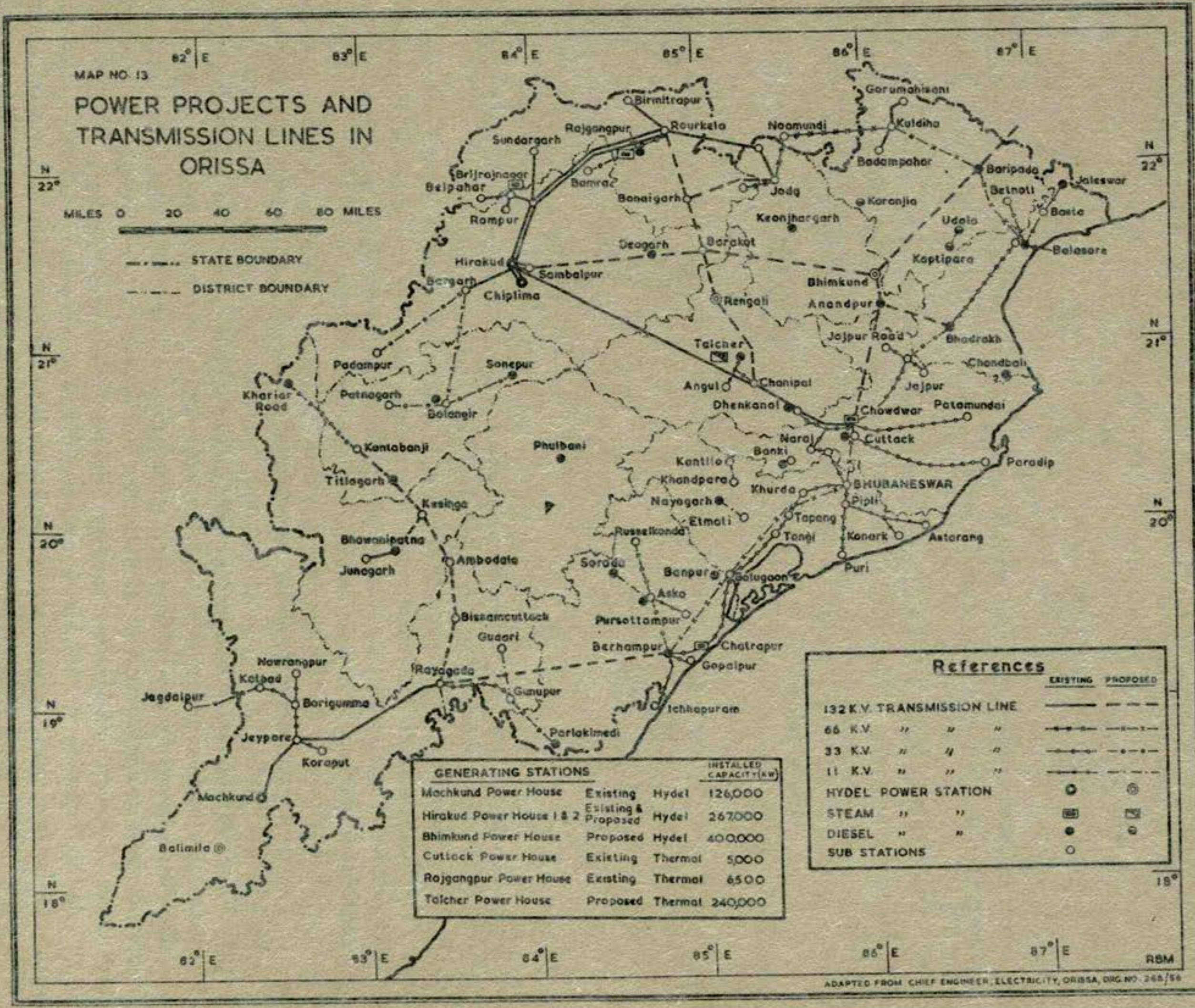
10.24 In their recent study of power demands, the State Electricity Department have estimated the load growth in the two major systems of Hirakud and Machkund. Their estimates are 300 MW for 1960-61, 532 MW for 1965-66 and 710 MW for 1970-71. Another estimate was by the Industries Department which put the requirements for 1960-61 as 200 MW and for 1965-66 as 500 MW.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

MAP NO. 13

POWER PROJECTS AND TRANSMISSION LINES IN ORISSA



GENERATING STATIONS			INSTALLED CAPACITY (KW)
Machkund Power House	Existing	Hydel	126,000
Hirakud Power House 1 & 2	Existing & Proposed	Hydel	267,000
Bhimkund Power House	Proposed	Hydel	400,000
Cuttack Power House	Existing	Thermal	5,000
Rajgangpur Power House	Existing	Thermal	6500
Talcher Power House	Proposed	Thermal	240,000

ADAPTED FROM CHIEF ENGINEER, ELECTRICITY, ORISSA, DRG. NO. 268/56

GSL

10.25 These three estimates can be summarized as follows:

Estimating Agency	(in MW)		
	1960-61	*1965-66*	*1970-71*
C.W.P.C.	230	482	694
Industries Department	200	500	..
Electricity Department	300	532	710

The three estimates differ to some extent and are perhaps based on different sets of data; however, the variation is only of the order of 10 per cent in 1965 and less than 4 per cent in 1970-71.

10.26 The National Council has also estimated the power requirements by the end of 1971 for the industries suggested in the State. The industry-wise distribution of power demands is as under:

Type of Industry	*Power demands (kW)*
1. *Large Scale*	*419,540*
(*a*) Metallurgical	353,500
(*b*) Metal-based	17,690
(*c*) Chemical and allied	40,100
(*d*) Forest-based	8,250
2. *Small Scale*	*1,790*
TOTAL	*421,330*

Thus the additional demands for power from the above industries amount to 421 MW. Nearly 90 per cent of the demand arises from metallurgical and metal-based industries.

10.27 The development of industries in the State is closely associated with the development of power. The State possesses both mineral and forest resources. There is scope for the establishment of forest-based industries. According to NCAER's Appraisal Report on Forests of Orissa large quantities of bamboo, rice straw and other grasses are available and the likely location for the suggested industries is Sambalpur district where electricity is available from the Hirakud project. The power requirement for the forest-based industries during 1961–71 would be of the order of 8,250 kW.

10.28 The mineral-based industries suggested would be concentrated in Keonjhar, Talcher in Dhenkanal, Sambalpur and Sundargarh districts. This is due to the locational factors and the availability of large reserves of iron ore, manganese, coal and limestone. The power requirement of these raw material oriented industries during 1961–71 is estimated at 411, 290 kW. This demand for power would be met from the Hirakud-Talcher power system.

10.29 At the beginning of 1961, the first stage of Hirakud power system will have been fully loaded. Taking into consideration the pending demands of consumers who have already notified their power requirements, the aggregate demand of the State is estimated as 190 MW by 1960-61. Assuming that approximately 45 per cent of the demand of industries proposed above materializes in 1961-66 and allowing for the growth of demands of existing consumers, the aggregate demand in 1966 is estimated as 500 MW. On similar assumptions the aggregate demand in 1971 may be

GSL

put at 860 MW. These figures do not take into account possible bulk supplies to the neighbouring States of Bihar and West Bengal.

10.30 These estimates result in doubling of the demand (actually the growth is in the ratio 1:2.6) between 1961 to 1966, giving a compound rate of growth of 21 per cent per annum. In the Fourth Plan period the demand increases by 72 per cent giving a corresponding growth rate of 11·5 per cent per annum.

10.31 Projections made by the NCAER of the effective consumption of electricity in India[1] indicate the following growth rates:

	1960	*1965*	*1970*
Effective Consumption (million kWh)	19,530	36,900	64,500
India with 1960 as 100	100	189	330
Rate of Growth (annual compound)	13·6%	11·8%	

In Orissa, however, effective electricity consumption would be faster—22·5 per cent annually during the Third Plan and 13·6 per cent annually in the Fourth Plan period (vide Table 52).

10.32 For the purpose of planning generating capacities the following may be taken as the requirements necessary.

	1965-66	*1968-69*	*1970-71*	*1972-73*
Capacity (MW)	575	800	1,000	1,230

Figures for 1968-69 and 1972-73 have been interpolated on the basis of the growth rates envisaged in 10·32 above. This means the addition on average of 75 MW per annum, during the first three years of the Third Plan and 100 MW during the last two years. During the Fourth Plan the average annual addition goes up to 120 MW. (Table 53).

SUPPLY OF POWER

10.33 The total generating capacity at the end of 1960 including 86·2 MW installed in industrial plants would amount to 264 MW. Work on extensions to the Hirakud power station to the extent of 75 MW, and construction of the Chiplima hydro power station with an installed capacity of 72 MW, was already commenced during 1955 to 1960. These projects are likely to be completed by 1961-62 (*vide* Fig. 1).

10.34 For a hydro scheme a period of a year or so is taken in preparing projects, estimates, site investigations, etc., assuming that all hydrological and topographical data have already been assembled. Addition of generating capacity commences 3 to 7 years from the date on which decisions are taken to start construction depending upon whether the plant is thermal or hydro-electric. Accordingly, with the system of Five Year Plans, the construction in each Plan period must cover the generating capacity requirements for at least a period of three years in the next

---

[1] *Demand for Energy in India, 1960–1975,* Table 9.2.1, National Council of Applied Economic Research, New Delhi.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

plan. Accordingly, the additional capacities for which planning must be undertaken would be as follows:

	1961-66	*1966-71*
Generating capacity required in 1968 (March)	715	
Generating capacity required in 1973 (March)		1230
Additional capacity for which construction should be undertaken	450	515

The proposed Bhimkund hydel project would take at least 7 to 8 years for construction. Accordingly, the initial installation would have to be undertaken in a thermal station at pithead—possibly at Talcher—with an initial capacity of 240 MW which should be completed by 1964-65. During the period 1966–68 Talcher's capacity is to be extended by 120 MW. The balance can be planned at the most favourable hydro sites, e.g., Bhimkund and Rengali in the north of Balimila or other appropriate site in the south. The southern projects would have to be planned in coordination with Andhra Pradesh, to the mutual advantage of both the neighbouring States.

Phasing of Generating Capacity

10.35 A programme for additional generating capacity is indicated on the attached graph (Fig. 1) and in Table 52. The assumption is that the maximum demands grow continuously from 190 MW to 500 MW during 1960-61 to 1965-66 and from 500 to 860 MW during 1965-66 to 1970-71. To ensure continuity of power supply, a power system should have sufficient generating capacity to enable it to shut down the largest generating set for repair without any reduction in power supply. It has been assumed that the power system would need standby capacity equal to 15 per cent of the effective demand, and on this basis a curve is drawn to indicate the minimum generating capacity needed. (Fig. 1)

10.36 The commissioning of the Hirakud extensions and of the Chiplima plant is phased in accordance with available information. The sizes of generating sets to be installed at Talcher and Bhimkund will have to be determined after a detailed study of the load growth, and other conditions, e.g., hydrology, space available for construction of the Bhimkund station, and base load and peaking duties required of the plant. However, as a preliminary plant, the Talcher plant is phased at 60 MW for 1963-64, another 180 MW for 1965-66 and additional 120 MW during 1966-68. The Bhimkund plant is phased in stages of 100 MW from 1968-69.

10.37 The total investment needed for carrying out the above programme is estimated at Rs. 85 crores in the Third Plan and Rs. 98·6 crores in the Fourth Plan. These estimates include a provision of Rs. 1 crore for each five year period for investigation of hydro-electric projects and other surveys that would be needed for a rational and economic development of the electricity system in the State. (Table 54)

Conclusions

10.38 The following are the broad conclusions:

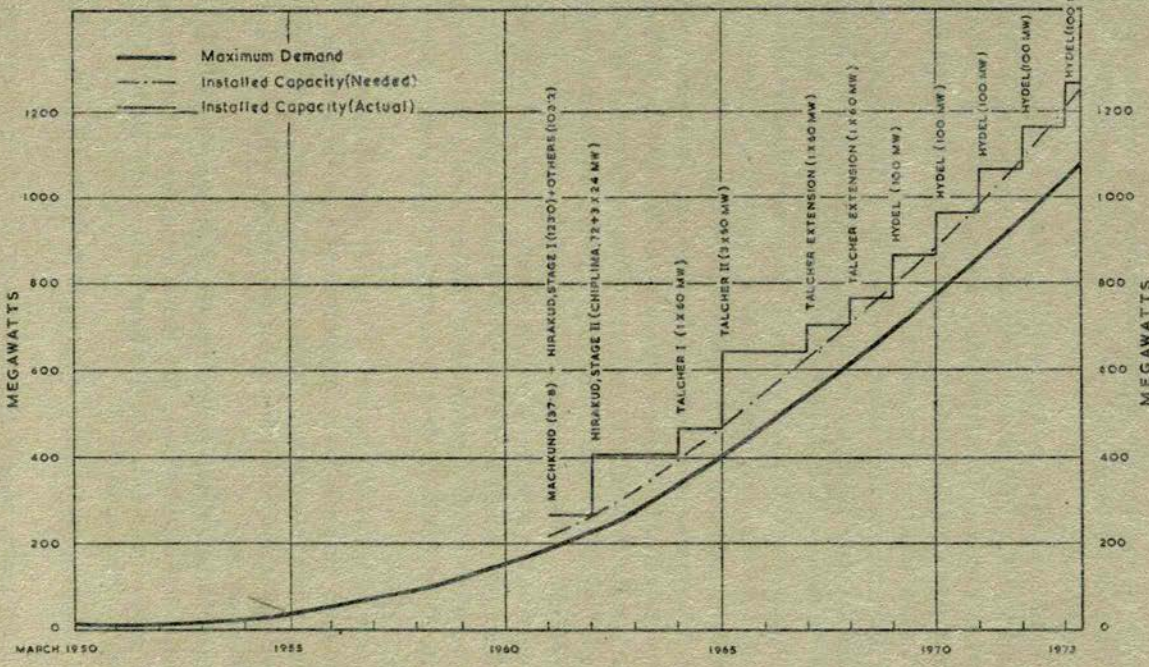
(*a*) Orissa has made remarkable progress in developing her electric power systems during the last decade (1951–60) increasing the total generating capacity from about 10 MW in 1950 to 264 MW by the end of 1960. There is, however, need and scope for further development in this field.

Fig. 1

ORISSA

Estimated Growth of Maximum Demand, Installed Capacity needed and Actual Installed Capacity (1960-61 — 1972-73)

(SELF GENERATING PLANTS INCLUDED)



RDM

(*b*) There are two distinct power systems in the State, viz., the Hirakud power system and the Duduma power system, which should be integrated at an early date to enable economical use of available generating capacity.

(*c*) On the Hirakud power system, there are two major load concentrations, which are likely to develop further as a result of locational advantages for raw materials and availability of electricity at economic rates. Demands for power on this system are likely to grow as fast as generating capacity can be added.

(*d*) On the Duduma power system, surplus generating capacity is at present available to the extent of 10 to 12 MW. This power system serves the Koraput district and lines are proposed to be extended to Ganjam, Kalahandi and Bolangir districts. This region is rich in mineral, forest and power resources, but growth of industry is handicapped by lack of adequate facilities in the form of road and rail communications.

(*e*) Existing transmission lines serve the districts of Sundargarh, Sambalpur, Balasore, Puri, Dhenkanal, Cuttack and Koraput and parts of Keonjhar and Mayurbhanj districts. Lines currently under construction and others proposed in the Third Plan will extend Duduma power to Kalahandi, Ganjam and Bolangir districts. In spite of these extensions, the district of Phulbani and parts of other districts will remain without electricity. These areas should be progressively served by plans for rural electrification and by installation of pilot diesel plants in isolated areas.

(*f*) Orissa has large reserves of coal and hydro-power from which electricity can be generated. The aggregate demand of the State is estimated at 190 MW by 1960-61. There will be a rapid rise in the demand for electricity in the succeeding decade—500 MW by 1965-66 and 860 MW by the end of 1970-71. To meet these requirements a total installed capacity of 1,000 MW is necessary by 1970-71. (The corresponding installed capacity by 1965-66 is 575 MW).

(*g*) Assuming that the growth of system demands and additions to generating capacity take place as visualized, there will be no overall shortage of generating capacity till the beginning of the Fourth Plan when the first extension at Talcher has to be undertaken. The present small surplus of about 12 to 15 MW in Orissa's share of the Machkund power station would be absorbed in the next two years.

(*h*) In planning future additions, care will have to be taken to ensure that the generating capacity keeps abreast of the anticipated demand by at least 15 per cent.

(*i*) Investigation of hydro-electric projects should be intensified so that by 1963 the State should have available detailed studies on five or six projects to enable them to select the most economical projects for construction.

(*i*) Apart from the Bhimkund project on which construction will have to commence as soon as detailed studies can be completed, the State must undertake preliminary works in 1963 on another hydro project; the total hydel requirement would be about 200 MW in 1968-70, and a further 300 MW by March 1973.

10.39 The following major steps are suggested for an effective power policy over the decade 1961–71.

(*a*) Planning for power should be undertaken on a long term basis; owing to the fact that hydro-electric projects take seven to eight years to construct, in undertaking construction of projects the power requirements of the next eight to ten years have to be taken into consideration.

(*b*) During the Third Five Year Plan, investigations should be undertaken of at least four or five hydro-electric projects, so that the State would be in a position to select the most economical ones for construction in the Fouth and the Fifth Plans (1966–77). This will ensure timely supply of power during the subsequent Plain periods.

(*c*) A thermal power station with an initial capacity of 240 MW should be constructed at Talcher. This power station should be designed for an ultimate capacity of 360 to 400 MW. This will cater to the power needs of the period 1963–68.

(*d*) Construction of a hydro-electric project of at least 500 MW should be undertaken as soon as possible at a suitable site, e.g., Bhimkund in the central eastern region.

(*e*) Steps should be taken to foster load growth in the south western region, i.e., Koraput, Kalahandi and Bolangir districts by opening up communications and by promotional measures for locating industries in this area and by appropriate special efforts to divert industries to this region.

(*f*) It is recommended that a basic transmission grid should be formed by inter-connecting Rayagada with Cuttack and Sambalpur through extra high tension transmission lines.

(*g*) In designing transmission lines, possibilities of the sale of power to the neighbouring States and where possible, of exchange of power with West Bengal, Bihar, Madhya Pradesh and Andhra Pradesh should be borne in mind.

(*h*) An overall investment of nearly Rs. 184 crores will be necessary during the coming decade to realize the above programme; of this Rs. 85 crores will be needed during the Third Plan.

CSL

Chapter 11

Transport

PRESENT POSITION

Railways

ORISSA IS PROVIDED with poor rail facilities. In 1957 there were only 858 miles of railways in the State and the ratio of route mileage to land area was 13·9 miles per 1,000 square miles or about half of that for India as a whole (27·3 miles per 1,000 square miles). With nearly twice the land area of West Bengal, Orissa had roughly one-third of the length of railway mileage.

11.2 Moreover, there are districts without railways, e.g., Keonjhar and Mayurbhanj, and there is no direct rail connection with Cuttack and the northern districts. Broadly, there are only three railway routes in the State: one along the eastern coast, another across the western districts of Koraput, Kalahandi and Bolangir, and a third across the northern districts of Sambalpur and Sundargarh (Map 14). The existing mileage is thus found only along the periphery of Orissa, the interior of the State having practically no railways.

Roads

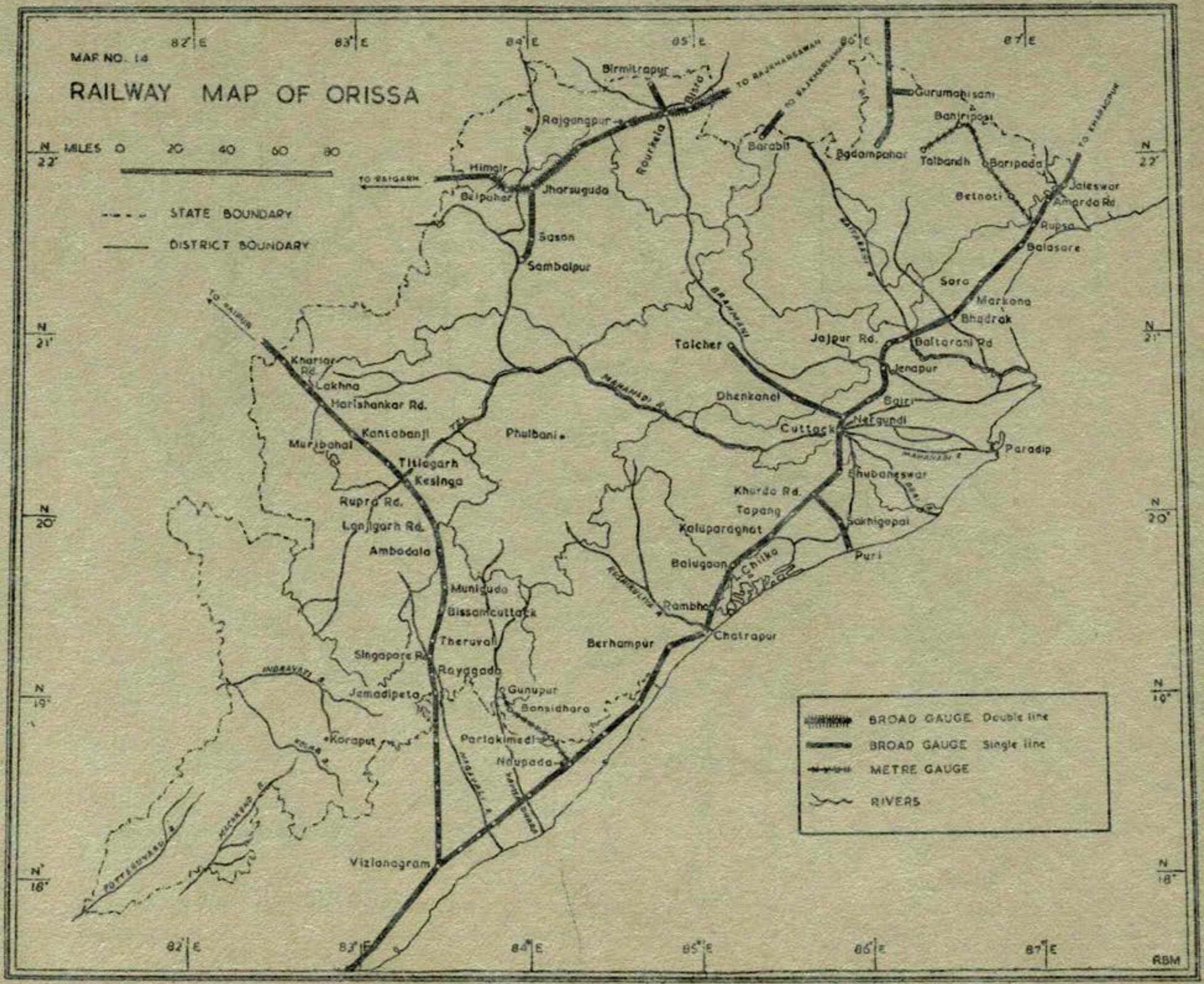
11.3 The deficiency of rail transport can usually be compensated by an adequate network of roads. However, the existing system of roads in Orissa is also inadequate. In 1958 there were 14,815 miles of roads in Orissa, or 246 miles of roads per 1,000 square miles as compared to 292 miles in the country. The adverse effects of the low road mileage are aggravated by the poor quality of roads. In 1958, only 17 per cent of the roads in Orissa were surfaced as against 38 per cent in India. This means that there were 44 miles of surfaced roads per 1,000 square miles in the State, or two-fifths of that in India (113 miles).

11.4 Further, like the railways, the road network is concentrated in the coastal districts, the interior of the State being relatively isolated. As can be seen from Map 15, the districts lying in the Eastern Ghats and the Northern Plateau, viz., Koraput, Kalahandi, Bolangir, Sambalpur and Sundargarh, have a particularly deficient road network.

11.5 Another major weakness of the road system is the existence of a large number of breaks or gaps in it, and the absence of connecting links. It is estimated that there are about 180 points where interruptions occur on account of the absence of bridges or culverts. These interruptions greatly hinder the movement of goods, and diminish the utility of the existing roads to a great extent.

Waterways

11.6 Orissa has 652 miles of inland waterways. The three main rivers, the Mahanadi,

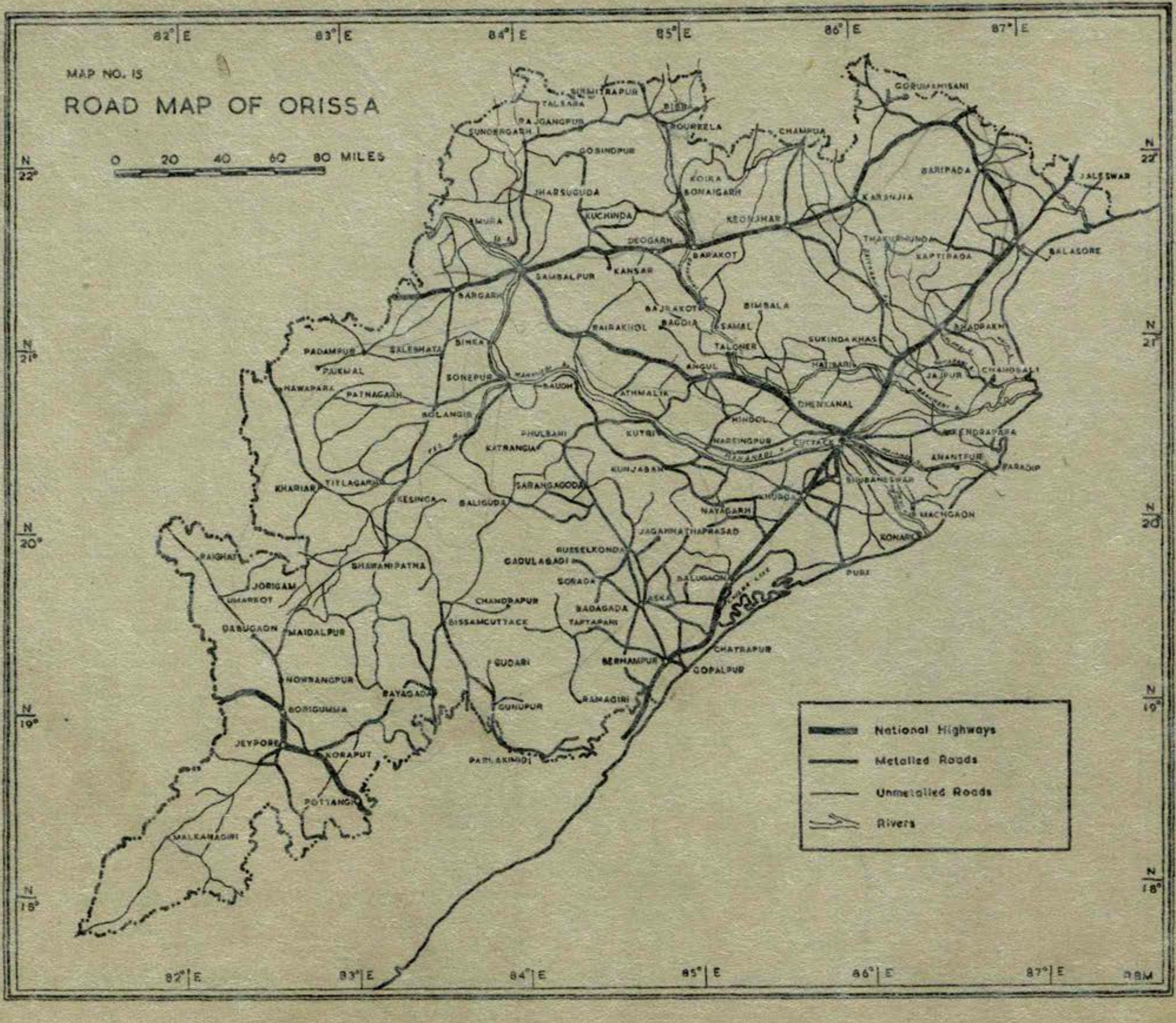


MAP NO. 14

RAILWAY MAP OF ORISSA

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL



MAP NO. 15

ROAD MAP OF ORISSA

the Brahmani, and the Baitarni have been utilized to develop a canal system (Map 16). More important of these are the North Orissa and the Rusikulya canals, each of which is about 270 miles long.

11.7 The inland waterways, like roads and railways, serve the coastal plain, providing the cheapest form of transport in the districts of Cuttack, Puri and Balasore. They act as feeders to the railways and roads in the region, and also provide a link with the sea. However, on account of their silting up, lack of proper maintenance of locks and banks, and their limited capacity of traffic, they are only a subsidiary form of transport in Orissa.

11.8 A survey of existing transport facilities in Orissa, thus, reveals a three-fold inadequacy. Firstly, there is the shortage of route mileage; secondly, the existing facilities are poor in quality; and thirdly, they are ill-distributed from the point of view of exploitation of the natural resources of the State.

TRANSPORT AND ECONOMIC DEVELOPMENT

11.9 The existence of adequate transport facilities is of fundamental importance for the economic development of an under-developed State like Orissa. The inadequacy of these facilities is one of the explanations of the paradox that despite the existence of large natural resources, Orissa continues to be a poor and backward State.

Agricultural Development

11.10 Agricultural development in a region is intimately related to the transport facilities. Increase in agricultural productivity is profitable only if there is a market to dispose of the surplus production. With the existing meagre transport facilities there are large parts of the State where, even at existing levels of productivity, there is a post-harvest glut resulting in low agricultural prices. By removing incentives for the farmer to increase production through intensive land utilization and improved techniques low prices act as a deterrent to any programme of agricultural development.

Industrial Development

11.11 The wealth of mineral resources in Orissa, in the context of the industrial policy of the Government of India which gives high priority to the development of basic and heavy industries in the public sector, and in view of the fact that this type of industry is resource-oriented, indicates the possibility of rapid growth of large scale industry in Orissa. In fact this growth has already begun, for the net output from factory industry increased by more than three hundred per cent in 1960-61 over 1956-57 as compared to only about 60 per cent increase in 1956-57 over 1950-51.

11.12 The transport needs stemming from this rapid growth of factory industry will be much greater due to the emphasis laid on steel plant development in the proposed programme for industrial growth in Orissa. The transport requirements of iron and steel industry are very large, since the volume of raw materials needed amounts to almost five times the finished product. Thus to produce one million tons of steel in 1961, the Rourkela Steel Plant will require 5·40 million tons of raw materials, mainly of mineral origin. Considering the distances over which these raw materials have to be moved, the total transportation involved in the movement of these raw materials is estimated at 4 to 5 million ton-miles (Map 17). In addition, transport facilities would also have to be provided for distributing one million tons of steel to areas of consumption within and outside the State. Steel production in the Rourkela plant is expected to increase to 2·5 million tons in 1971. The requirements for the transportation of raw materials would then rise to an estimated 113 million ton-miles.

11.13 In addition to the Rourkela plant, another steel plant has been suggested for Bonaigarh with a production target of two million tons for 1971. The approximate amount of transport required for assembling the raw materials for this plant would be 714 million ton-miles.

11.14 Clearly the programme for industrial expansion of which steel development is only a part, though the most important one, will make heavy demands on transport by road as well as by rail. Unless adequate transport facilities are provided, this programme of development cannot be fully implemented.

11.15 The growth of mineral-based industries envisaged in the next ten years implies substantial expansion of mining activity. In addition to the requirements of these industries, the existence of large supplies of iron ore close to the coast has encouraged the idea of exporting it abroad to earn foreign exchange. This would require additional transport (including port) facilities.

Development of Fisheries

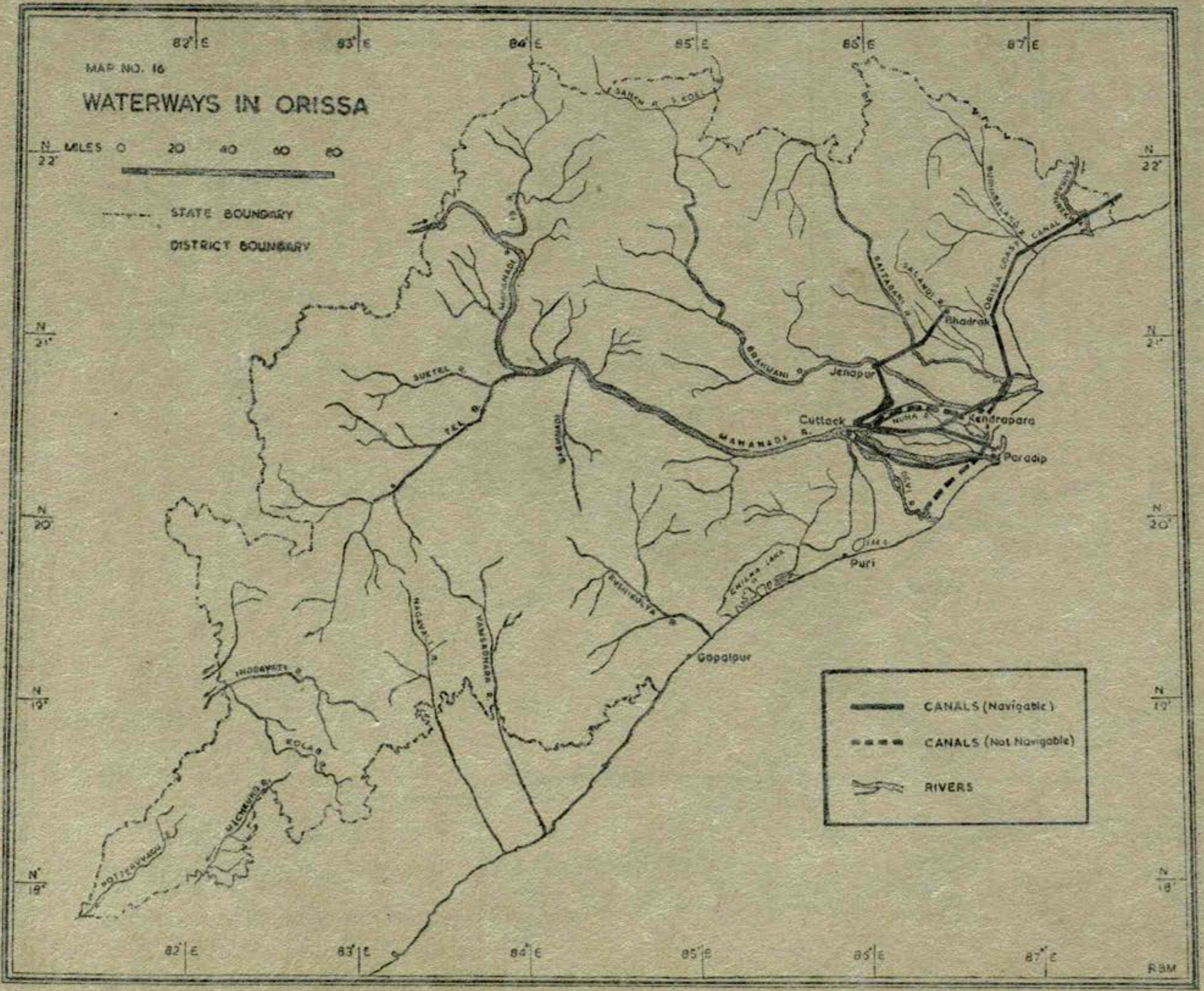
11.16 These are great potentialities for the development of both inland and sea fisheries in Orissa. On account of the perishable nature of the commodity, transport is of vital importance to this industry. Good roads and suitable transportation facilities from the sea ports of Paradip and Kujong to Cuttack—the largest urban area and rail head in the State—for export to the Calcutta market are necessary for the expansion of sea as well as estuarine fishing.

Transport in the Plans

11.17 In response to the need for transport facilities to exploit the resource potential of the State, programmes of road as well as railway development were undertaken in the First and Second Plans. At first, on account of poor economic development, requirements were so small that no acute shortage of transport was experienced despite the fact that the available facilities were meagre. As a result the development programme for the First Plan was quite modest. With the stepping up of the pace of industrial development in the Second Plan, the scarcity of transport, mainly the absence of a connection between the north and the south of the State, and the existence of gaps and interruptions were increasingly felt. This led to greater emphasis on transport development in the Second Plan.

11.18 In both the Plans, emphasis in road development was mainly on the improvement of existing facilities. Thus, in the First Plan, about 781 miles of roads were improved, 72 miles were metalled and 30 miles were constructed. In addition, 16 bridges were also built. In the Second Plan 909·5 miles of roads have been improved, 18·5 miles of roads have been constructed and 39 bridges completed.

11.19 In the First Plan, not much development in railway transport took place. But in the Second Plan, as a result of the decision to set up a steel plant in the State and in order to accelerate mineral extraction for export, certain specific developments became necessary. There was doubling of several sections of railway track, provision of crossing stations and renewal of existing

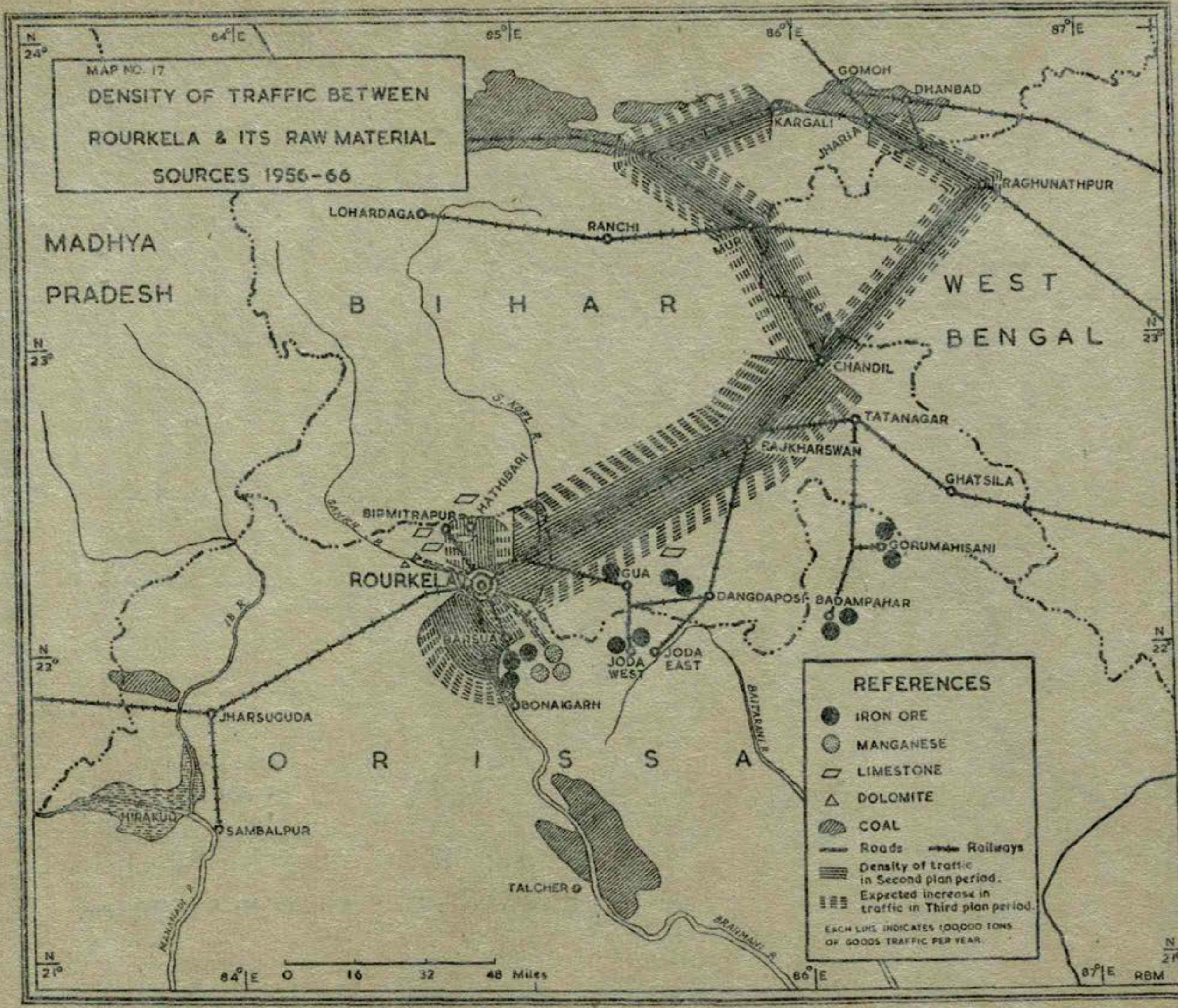


MAP NO. 16

WATERWAYS IN ORISSA

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL
524



MAP NO. 17

DENSITY OF TRAFFIC BETWEEN ROURKELA & ITS RAW MATERIAL SOURCES 1956-66 track. In addition, it was planned to construct 83 miles of new lines and a scheme was drafted to build the Sambalpur-Titlagarh line connecting the coastal areas with North Orissa. The progress made in the implementation of the principal rail projects is shown in Appendix 8.

11.20 In addition to road and rail development, the two canal systems connecting Cuttack with Paradip port, viz., the Taldanda and the Kendrapara canals are being remodelled by the Delta Irrigation Organisation to facilitate the movement of goods in that area.

FUTURE DEVELOPMENTS

Roads

11.21 Of the different forms of transportation, roads take precedence for development because they can reach areas not served by railways or waterways. Moreover, railway construction requires a large investment of capital, takes time to complete, and depends on other forms or transport for bringing traffic to the railhead. An accelerated programme of road development required in Orissa as assessed in the Road Development Plan in India, 1961–81, by the Chief Engineers of States (1958) is indicated in Table 55.

11.22 The national highway extension schemes included in this programme are shown in Map 18. More important among these are roads from Sambalpur to Ambikapur (Madhya Pradesh), Sambalpur to Rourkela and Jamshedpur (Bihar), Berhampur to Titlagarh and Raipur (Madhya Pradesh), and two roads connecting Titlagarh to the national highways running between Sambalpur and Raipur, Vijayanagar, Balasore, Kharagpur and Cuttack.

11.23 If the Road Engineers' Plan is fully implemented Orissa will have 52 miles of roads per 100 square miles of area. Every place in a developed agricultural area will be within 1·5 miles of a road and within 4 miles of a metalled road. In the less developed areas no place will be more than 3 miles from a road and more than 8 miles from a metalled road. Even in underdeveloped areas, all places will be within 5 miles of a road and 12 miles of a metalled road.

11.24 As against the long run goals laid down in the Twenty Year Road Development Plan, the State Government proposes to concentrate only on improvements to existing roads and the repair of breaks and interruptions in them. The most important of the bridges planned to be built is one across the Mahanadi to complete National Highway No. 5, running from Calcutta to Madras and to connect Cuttack with the districts in the North. The estimated cost of this bridge is about Rs. 1·4 crores. The tentative proposal for the Third Plan is to allot about Rs. 10·5 crores to road development—about Rs. 7·5 crores for the State sector and Rs. 3 crores for the Central sector. The targets to be aimed at are indicated in Table 56.

11.25 However, in view of the retarded development of roads in Orissa and the proposed programme for agricultural and industrial growth, the tentative road development plan for 1961–66 is too modest as compared with the rate of development envisaged by the Chief Engineers' Programme. It is suggested that at least one-third of the Twenty Year Plan for the State should be implemented within the Third Five Year Plan. As indicated in Table 57, this means that about 3,097 miles of National and State Highways and district roads should be constructed during this period. In addition, a road should be built between Kujong and Paradip port. The total cost of this road development programme would be about Rs. 17·2 crores. If it is fully implemented, the road system created would be able to meet nearly all road transport requirements necessary for the developments anticipated during the Fourth Plan.

Forest Roads

11.26 At present there are only 2,775 miles of forest roads in Orissa, or 0·1 mile per square mile of forest area. Road mileage in relation to forest area varies from district to district, and there are regions in Bonai, Kalahandi, Koraput, Phulbani and Keonjhar districts which are inaccessible by road and have not yet been opened up. The State forest department has set a standard of 1 mile of road per square mile of forest. The tentative target for the Third Plan is to construct 1,512 miles of new roads and improve 1,000 miles of existing roads. This target is too modest and it is suggested that it should be raised to about 2,500 miles, and a target of an additional 5,000 miles of roads should be set up for 1966–71. This would bring the ratio of road mileage to 0·4 per square mile of forest. The total cost of the programme is estimated at Rs. 4 crores, of which Rs. 3 crores will be for new roads and the remainder for improving existing roads. The major requirement of forest roads is for the Sambalpur-Brajrajnagar and the Berhampur-Aska area, since the third centre of forest-based industries, viz., Cuttack, gets timber that is floated down the Mahanadi. Another region where new roads should be constructed is in the Ganjam and Koraput districts, where, because of the rich forest potential, another centre of forest-based industries may be developed.

Railway Development

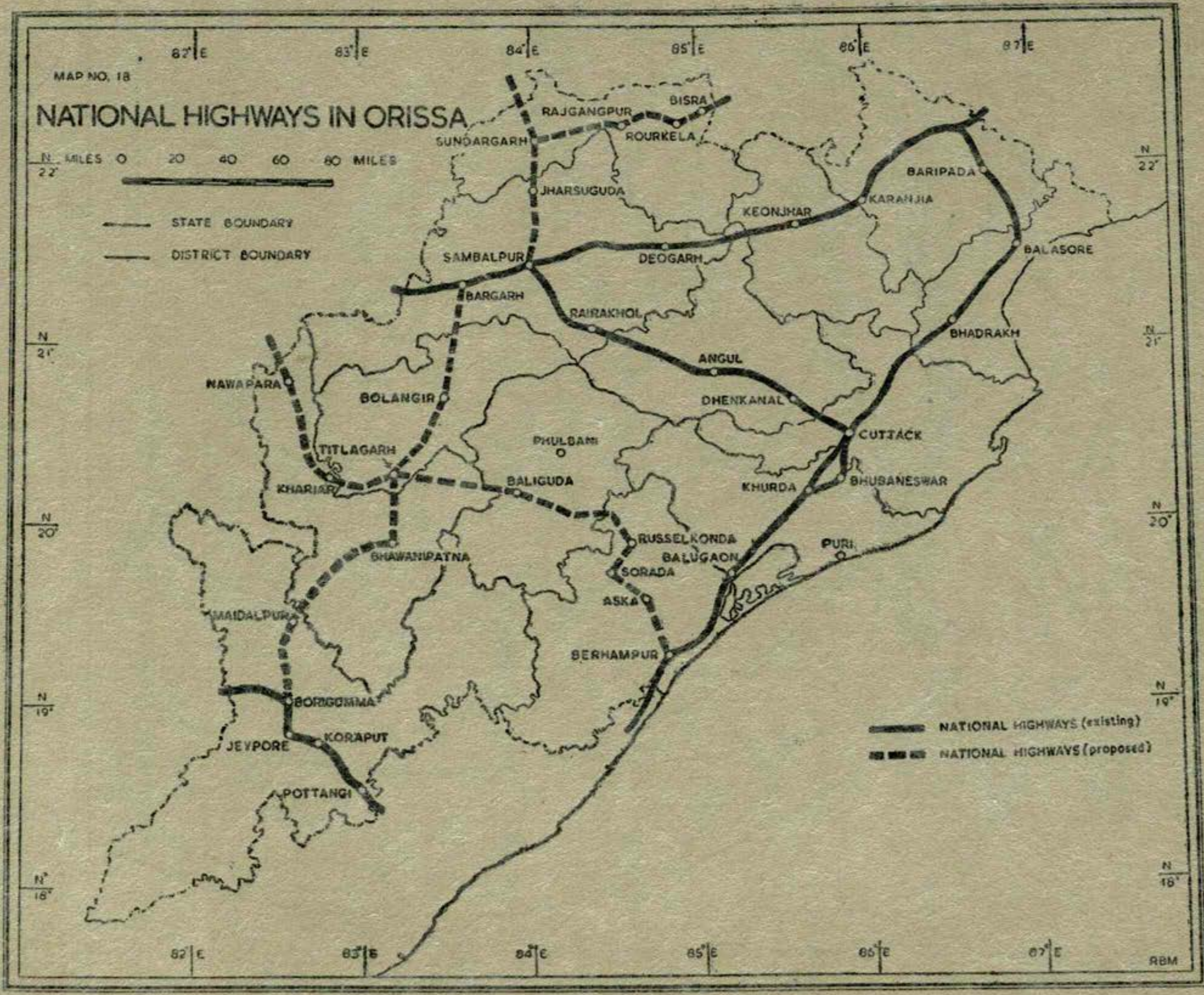
11.27 For facilitating the exports of iron ore from the Tomka–Daiteri deposit located 112 miles from Paradip port, it is necessary to construct a rail-link from the mines to the main line of the South Eastern Railway, 17 miles away. This would reduce the cost of transport by about Rs. 10 per ton. Since it is estimated that Tomka and Daiteri can produce about 1 million tons of ore annually by 1962-63, the total saving in the cost of transport on the export of the ore would be about Rs. 1 crore per year. The estimated cost of construction of the line is Rs. 2 crores and of a railway siding, to transfer the ore to the canal head for shipment by water to Paradip, another Rs. 1 crore. Other connecting lines which should be constructed are: Sambalpur to Titlagarh which would provide a direct route to Visakhapatnam; from Domaro to Talcher, which would shorten the distance between Rourkela and Cuttack; and from Cuttack to Paradip.

11.28 In addition to these, another line thirty miles long, connecting Gua and Manoharpur, would help to open up the Keonjhar iron ore and manganese deposits. Though 500,000 tons of iron ore are already being mined here and exported, the increase of production by another million tons is hampered by the overcrowding of the rail route to Calcutta. Although longer by about 30 miles, the route to Paradip via Gua, Manoharpur, Rourkela, and Talcher will be less congested.

11.29 The expected expenditure on the construction of the suggested new lines and the provision of open line facilities is given in Table 58.

Inland Water Transport

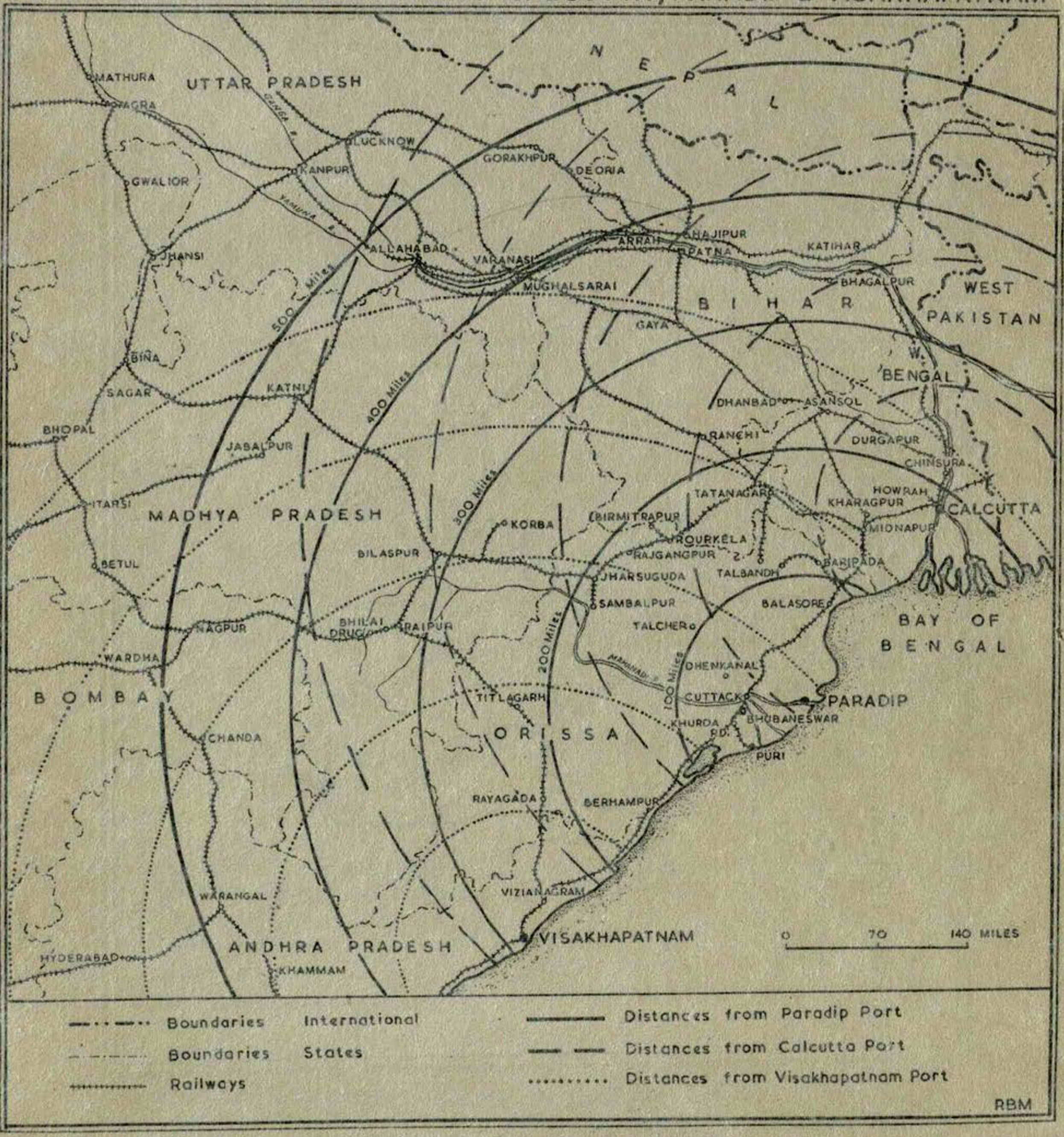
11.30 As regards improvement of inland water transportation, it is suggested that the recommendations made by the Inland Water Transport Committee, 1959 should be adopted for the Third Plan. The project recommended by the Committee and rough estimates of the costs are shown in Table 59. Most of these projects are interdependent and therefore a beginning should be made with the programme with the object of completing it by 1966.


MAP NO. 18
NATIONAL HIGHWAYS IN ORISSA
MILES 0 20 40 60 80 MILES
STATE BOUNDARY
DISTRICT BOUNDARY
NATIONAL HIGHWAYS (existing)
NATIONAL HIGHWAYS (proposed)
82° E
83° E
84° E
85° E
86° E
87° E
N 22°
N 21°
N 20°
N 19°
N 18°
BISRA
RAJGANGPUR
ROURKELA
SUNDARGARH
JHARSUGUDA
BARIPADA
KARANJIA
KEONJHAR
BALASORE
SAMBALPUR
DEOGARH
BARGARH
RAIRAKHOL
BHADRAKH
ANGUL
NAWAPARA
BOLANGIR
DHENKANAL
CUTTACK
PHULBANI
TITLAGARH
KHARIAR
BALIGUDA
KHURDA
BHUBANESWAR
RUSSELKONDA
PURI
BALUGAON
SORADA
BHAWANIPATNA
ASKA
MAIDALPUR
BERHAMPUR
BORIGUMMA
JEYPORE
KORAPUT
POTTANGI
RBM

CSL

MAP NO. 19

HINTERLANDS OF THE PORTS OF CALCUTTA, PARADIP & VISAKHAPATNAM



CSL

Port Development

11.31 The development of Paradip as a major deep-sea port is implicit in the programme of rail and canal development suggested above. There are many reasons in favour of this. Paradip is favourably located in relation to several of the iron ore deposits of the State, and if facilities are provided it would be able to handle large exports of ore. Its geographical location (Map 19) is also advantageous for meeting the need for a deep-sea port between Calcutta and Visakhapatnam, as stressed by the Port Technical Committee in 1948. The hinterland of Paradip is rich in minerals and includes not only Orissa but also large parts of South Bihar, Eastern Uttar Pradesh and Eastern Madhya Pradesh. With the construction of Domaro-Talcher railway line suggested above, all railway stations west of Manoharpur will be nearer to Paradip than to Calcutta, while all stations east of Bilaspur will be nearer to it than to Visakhapatnam.

UTILIZATION OF ROAD FACILITIES

11.32 In addition to the provision of various forms of transport facilities, it is necessary to plan for their proper utilization. This aspect of the problem arises only for roads and inland waterways.

11.33 For the proper utilization of the existing road system, a scheme for nationalization of road transport was started in 1947-48 with financial assistance from the Centre. Orissa was divided into five zones, three being earmarked for State-owned transport and the other two for the Orissa Road Transport Co. established in 1951 with the joint participation of the State Government, the Union Government, ex-operators and employees of the company. The total route mileage of these national undertakings is about 5,000 miles. With the expected increase in passenger traffic, it is suggested that this should be increased by about 14,300 miles during the period 1960–66, mainly in the Puri, Sambalpur and Ganjam zones (Map 17). The estimated additional cost for vehicles, workshop and passenger amenities is estimated to be about Rs. 1·5 crores.

11.34 The number of trucks operating in the State increased from 2,440 in 1953 to 5,316 in 1958—by more than 100 per cent. With the development of the road system suggested here, the expected growth of industrial and agricultural production, and the rise of urban population, it may be expected that the number of trucks will continue to double every five years till 1971. The benefit from this increase would be greater if the present pattern in which single-truck operators predominate and which is responsible for haphazard and inefficient operation were organized, preferably on a cooperative basis, to operate medium or large-sized fleets.

11.35 There are at present 38,000 country boats plying in the State. The boats are generally built on river ghats and the sea coast by local carpenters. The number of people engaged in various capacities in inland water transport are estimated at about 100,000. With the proposed use of canals for shipping ore to the sea coast and the improved canal system, a large increase in the waterways' traffic may be expected in the next ten years.

INVESTMENT

11.36 The investment required for improvements and extension in transport facilities suggested

CENTRAL SECRETARIAT LIBRARY 62- GOVT OF INDIA

here is shown in Table 60. With this investment, the transport facilities in Orissa at the end of the Third Plan would be sufficient to meet the needs of agricultural and industrial development envisaged during 1961–71. Because the availability of transport is a basic condition for economic development, it is essential that the programme suggested for the extension of the existing facilities should be fully implemented as early as possible, preferably in the first three years of the Third Plan.

11.37 A large number of Government Departments deal with transport matters which leads to gaps and duplications and prevents a comprehensive view being taken of transport problems. It is, therefore, suggested that the agencies dealing with the different aspects of transportation should be reduced to as small a number as possible. A case can be made out, in the interest of efficiency, for integrating functions relating to all forms of transport—roads, inland waterways and ports—and putting them under the charge of one department within the State. The implementation of the programme for the extension of transport set forth above would be facilitated by rationalization of the Government machinery dealing with transport affairs.

GSL

Chapter 12

Manpower

THE OBJECTIVE OF this chapter is to see to what extent the supply of manpower—both skilled and unskilled—will be adequate in relation to demand over the present decade for skilled and unskilled labour; and the repercussion that the industrial demand for labour will have on the supply of labour in agriculture; and suggest ways of meeting manpower deficiency both in industry and agriculture.

Demand in the Non-Agricultural Sector

12.2 The programme of development discussed in this report would result in an all-round increase in manpower requirements. The magnitude of this increase in the non-agricultural sector is estimated and presented in Table 61. As a first approximation it is assumed that no increase in employment in agriculture takes place. Later this assumption is relaxed to bring out full implications of the probable increase in demand for agricultural labour.

12.3 Thus during the period 1961–71, additional requirement for manpower in the non-agricultural sector would be about 1·40 million of which the largest increase would be in the tertiary sector followed by mining and construction.

12.4 To match this requirement of manpower three sources of supply are available: the backlog of unemployed persons, excess of immigrants over emigrants and the new entrants to the labour force; and, of these, the third source is the most important.

12.5 The backlog of unemployment in the rural labour force, (which constitutes nearly two-thirds of the total force) is very difficult to estimate. The difficulty arises chiefly on account of the fact that the force comprises open unemployment which is negligible and disguised unemployment which is widespread, but does not lend itself to any straightforward measurement widespread. Disguised unemployment and its relation with the supply of manpower is therefore treated later and it is assumed that no backlog of unemployment exists in the rural labour force. For the urban labour force, the results of the NSS Survey[1] provide a basis for estimating unemployment. According to this report 1·75 per cent of the urban population was unemployed in 1955. Urban population in 1961 is estimated at 1·11 million. On the assumption that roughly the same proportion of the population is unemployed in 1961 as in 1955, the unemployed in 1961 would number 19,000. This is taken as the backlog of unemployment for the decade 1961–71.

12.6 There was a net emigration of roughly 200,000 persons from the State over the decade 1941–51. The largest number of emigrants went to West Bengal. Although precise information can be given only when the details of the 1961 Census are available, in recent years there seems to have been a noticeable decline in the number of persons emigrating annually from the State. This trend is likely to be strengthened in the present decade when a rapid rate of industrial development would create a large number of employment opportunities in the State. For estimating the supply of manpower during the period 1961–71 net migration is, therefore, assumed to be negligible.

---

[1] National Sample Survey, Report No. 15.

12.7 The number of new entrants to the labour force for the period 1961–71 would be equal to the sum of persons who offer themselves for employment for the first time in each successive year of the period. This would be represented by the excess of the number of persons belonging to the labour force in 1971 over the labour force in 1961. The labour force including the unemployed in 1961 is estimated at 7·01 million and the labour force in 1971 at 8·51 million.[1] The number of new entrants to the labour force for the period 1961–71 thus comes to 1·5 million.

12.8 If to this is added the backlog of urban unemployment (19,000), the total supply of additional manpower in 1971 would be of the order of 1·5 million, as against the requirement of 1·4 million in the non-agriculture sector.

12.9 It will thus be seen that in the aggregate a little more than sufficient manpower would be available in the State to meet the requirements of the non-agriculture sector. On this basis about 120,000 additional workers will have to depend upon agriculture for employment.

Demand in Agricultural Sector

12.10 Contrary to common belief, increase in the intensity of cultivation through the use of irrigation, fertilizers and better practices requires a higher labour input per acre.[2] It has been estimated in Chapter 2, that during 1961–71, agricultural output in Orissa will increase at a rate of 6·5 per cent per annum. There is no doubt, therefore, that compared to 1961 a larger input of labour would be required in agriculture in 1971. The additional labour available to agriculture (120,000) would amount to only a small increase (2·8 %) in the existing agricultural working force. This by itself may not be adequate to meet the incremental requirement, unless labour saving implements are used in agriculture on fairly wide scale. However, since this is not possible in the short run, particularly in a State like Orissa, the aggregate supply of labour by 1971 is likely to fall short of the aggregate demand. Such a situation will affect agricultural production and land productivity somewhat adversely.

Occupation Pattern

12.11 Apart from adding considerably to this demand for labour the development programme suggested in this report would significantly change the disposition of the working force as between different sections of the economy. In Table 62, the proportion of the total working force in Orissa employed in the various sectors of the economy in 1961 is compared with the estimated proportions in 1971.

---

[1] The working force in 1961 is estimated by assuming that the participation rate in the rural as well as the urban population would be the same in 1961, as in 1951, i.e., 40 per cent and 37 per cent. The total population of Orissa according to the 1961 Census is 17·57 million. Of this 16·46 million is rural and 1·11 million urban.

The total population in 1971 is estimated at 21·35 million. In view of the accelerated growth of industries in the State more rapid rate of urbanization is envisaged. It is expected that the proportion of urban to total population would increase from 6% in 1961 to about 12% in 1971. On this basis urban population in 1971 would be 2·60 million and rural 18·75 million. To calculate the labour force the same participation rates are assumed, an addition of 1·75% being made to the urban rate to include the unemployed persons. On this basis the labour force in 1971 works out to 8·51 million.

[2] *Farm Management Surveys*, Madras, West Bengal, etc.

GSL

12.12 The distribution of working force in 1961–71, shows a decline in the proportion of the working force engaged in the primary sector from 73·1 per cent to 62·8 per cent, an increase of 5 per cent in the secondary sector and 5 per cent in the tertiary sector. These shifts are in favour of sectors in which labour productivity is higher. Because of this and also due to the fact that agricultural productivity is likely to increase much faster than the increase in the working force in agriculture, increase in employment by 1971 would be accompanied by a higher level of overall labour productivity. This is important as present productivity levels in Orissa are very low.

PRODUCTIVITY

12.13 The net output per worker in factory industry in Orissa in 1956-57 was Rs. 1,500, in non-factory industry Rs. 494 and in agriculture Rs. 300. For India as a whole the corresponding estimates of net output per worker were Rs. 2,100, Rs. 790 and Rs. 500. The main reason for the low labour productivity in the State is technological backwardness. Lack of transport communications, large tribal population and poor health condition of the people, also affect productivity adversely.

12.14 Paucity of transport and communication facilities affects the economy of the State in two ways. First, by restricting the movement of commodities it limits the effective markets for the producers. Resulting depressed prices rob the producer of the incentive to increase production by more intensive effort and better techniques. Second, and less obviously, it tends to isolate the people from contact with modern modes of production and consumption. This is clearly manifest from the fact that the State's economy is much more characterized by numerous isolated small communities in most of the other regions. This inevitably affects the people's attitude to work and their receptivity to improved techniques.

12.15 The isolation due to poor communications is intensified in Orissa by the presence of a relatively large element (20%) of tribal people in the population.

12.16 Moreover, the diet of the people of Orissa is found to be deficient in many essential nutrients. This lowers resistance to diseases, therefore, and makes the people a prey to several endemic as well as epidemic diseases. Although the public health facilities are improving, the check on the incidence of diseases is still far from satisfactory. Together, both these factors have sapped the vitality of the worker and reduced his capacity for sustained productive work.

(a) *Labour Productivity in Non-Agricultural Sector*

12.17 These handicaps notwithstanding, the development efforts of the two Plans have undoubtedly led to some increase in labour productivity. With the programme of development suggested in this report further increase can well be expected. An emperical evaluation of productivity changes except for the organized industry is difficult to make for lack of data. An estimate for 1961 and 1971 has, however, been attempted on certain reasonable assumptions[1] to provide a rough assessment of the likely change over the present decade (Table 63). The net output per worker in the non-agricultural sector as a whole is likely to rise by 80 per cent between 1961 and 1971, i.e., at an average rate of 8 per cent per year. This high rate of increase

---

[1] See Note to Table 61.

GSL

would be feasible on account of a 300-per cent rise in the productivity in factory industry brought about mainly through the steel plants.

(*b*) *Labour Productivity in Agricultural Sector*

12.18 Agriculture has been treated here as the sector which will absorb all labour that does not find employment elsewhere. The addition to the agricultural labour force on this basis would be of the order of 120,000 and the average product per worker Rs. 563 in 1971. However, in actual fact, as has been argued, the demand in the sector itself and other factors restricting mobility of labour from rural to urban areas may lead to a larger increment in the agricultural labour force. A part of the demand for labour in non-agricultural occupations would then have to be met by immigrant labour.

12.19 If the entire additional labour requirement in non-agricultural activities is met by labour force from within the State, without mechanization of farming, the rise in labour productivity in agriculture over the decade would be 48 per cent as against 80 per cent increase in the non-agricultural sector. If labour saving appliances were introduced in agriculture, additional labour force may not be released for non-agricultural activities, but labour productivity in agriculture would increase and this difference between the productivity in the two sectors would be reduced.

12.20 The need to augment labour productivity in agriculture with all means available must be emphasized not only for raising the low incomes of the agricultural population but also for reducing the wide gap that is likely to arise between the income levels in agriculture and the other sectors. Even with a labour productivity of Rs. 563 which would be possible only if all the requirements of manpower in non-agricultural activities are met by rural labour force from within the State, the disparity between the labour productivities of the two sectors (Rs. 1840 in the non-agricultural sector as a whole) would be glaring. With the existing technology in agriculture disparity of this order is to be expected. It can be reduced only if labour saving appliances are introduced in agriculture on a wide scale.

TECHNICAL PERSONNEL

12.21 So far the additional requirement of manpower has been considered in the aggregate sense. In actual fact, however, supply of manpower should be viewed in terms of different types of skills which are required in different fields.

Demand and Supply

12.22 Adequate information is not available for making an accurate estimate of the requirement for technically trained personnel for the next ten years. However, on the basis of available technological ratios for different industries, mines and power units, and on certain assumptions regarding requirement of technically trained personnel in the development programme of the Government an estimate has been made for the period 1961–71 and is presented in Table 64. On the basis of information available regarding training facilities likely to be available by 1961, estimates of the supply of different categories of technically trained personnel has also been made and is set against corresponding estimates of requirement in Table 65.

12.23 According to these estimates the annual requirement for engineers (including diploma holders) would be 70 per cent higher than the annual outturn of training institutions within the State. The situation in respect of craftsmen would be even worse with the annual requirement more than three times as large as the annual supply.

Expansion of Training Facilities

12.24 It is very clear that a big programme for expanding technical training facilities is necessary in the State. The requirements indicated in Tables 64 and 65 are annual averages for the ten-year period, and disguise the fact that at the beginning of the period requirements would be lower and at the end of the period significantly higher, than the averages. In addition, further capacity must be provided towards the end of the decade to meet the requirements at the beginning of the next period. This is necessary because there is a time-lag of 3 to 4 years between the provision of training facility and the actual availability of trained personnel. It is suggested that the capacity for training engineers and diploma holders should be more than doubled and that for craftsmen increased by four and a half times between 1961–71. In view of the time-lag the bulk of this capacity should be provided in the early part of the Third Plan.

12.25 Although additional capacity for training craftsmen will be provided in the State through the National Apprenticeship Scheme and the State Government schemes, the gap between the requirement and expected supply is so large that unless industry comes forward to take the major portion of the burden on its shoulders it is unlikely that the gap would be filled. It is, therefore, suggested that industry should be encouraged to participate in the State's programme for providing training facilities on a regular and organized basis.

12.26 To achieve this end a committee consisting of representatives of the Industries Department, industrialists and technical schools may be formed which would be responsible for planning the expansion of training facilities in the State. In order to be specific in its plan the committee would have to be well informed regarding the requirements of different types of skill likely to arise during the next few years. The Industries Department could provide this information by conducting periodical surveys and by analysing applications for licences. In addition to planning for training programmes for fresh entrants to the labour force, the committee could also help organize facilities for refresher courses for employed workers and apprenticeship training for graduate engineers or diploma holders. Since Orissa is expected to have a large public sector in industry it is suggested that a lead in this matter must be given by the public sector factories.

12.27 In a backward region provision of facilities for technical training is not all that is required to increase the supply of skilled workers. Often the response of the people to these facilities turns out to be poor and the facilities provided are not utilized fully. This might well happen in Orissa where besides the general backwardness of the people there is a large semi-isolated tribal population. A suitably devised propaganda to attract prospective industrial workers to undergo training should be carried on throughout the State especially in the rural and backward areas.

GSL

Chapter 13

Public Health

PUBLIC HEALTH CONDITIONS in Orissa are very depressing even in the context of an underdeveloped country like India with its high incidence of diseases and a high mortality rate.

13.2 During the decade 1941–50[1] the estimated birth rate in the State was 41·8 per 1,000—nearly the same as in all-India (41·5), but the death rate (33·3) was over 16 per cent higher than the all-India rate (28·5). Orissa was among the States with high death rate (Table 67). The infant mortality rate was 133 as against 113 in all-India.

13.3 The data published by the State Government, for later years, though based on partial coverage of births and deaths, show a decline in both birth and death rates. It is not possible to correct these figures for under-reporting[2] so as to make them comparable with those for earlier year. But there are reasons to believe that there has been considerable improvement in death rate on account of better health and medical facilities made available during the period. However, the rate of decline in Orissa has been slower than in the country as a whole. The death rate in the State fell by about 14 per cent between 1951 and 1957, whereas in all-India the decline during the same period was of the order of 23 per cent.[3]

Proximate Causes

13.4 Given the age composition of the population, higher death rates normally imply a widespread prevalence of disease. The present population of Orissa is about 17·6 million and with a death rate of about 28·22,[4] the annual number of deaths in the State would be about 390,000. Of these, it is estimated that about 293,000 or three-fourths, die of fever, dysentery and diarrhoea, respiratory diseases, cholera and small-pox. The balance of deaths can be assumed to be due to old age and other causes.

Fever and Other Diseases

13.5 Fever (including malaria) accounts for about 81 per cent of deaths due to major diseases,

---

[1] Data on birth and death rates in Orissa for recent years are being collected and published by the State Directorate of Health, but they suffer from a large degree of under-reporting, and no firm estimates can be derived from them. As such, the estimates for the decade 1941–50, derived from the Population Census Statistics, used by the NCAER for their population projections are preferred in this discussion for comparison with all-India rates.

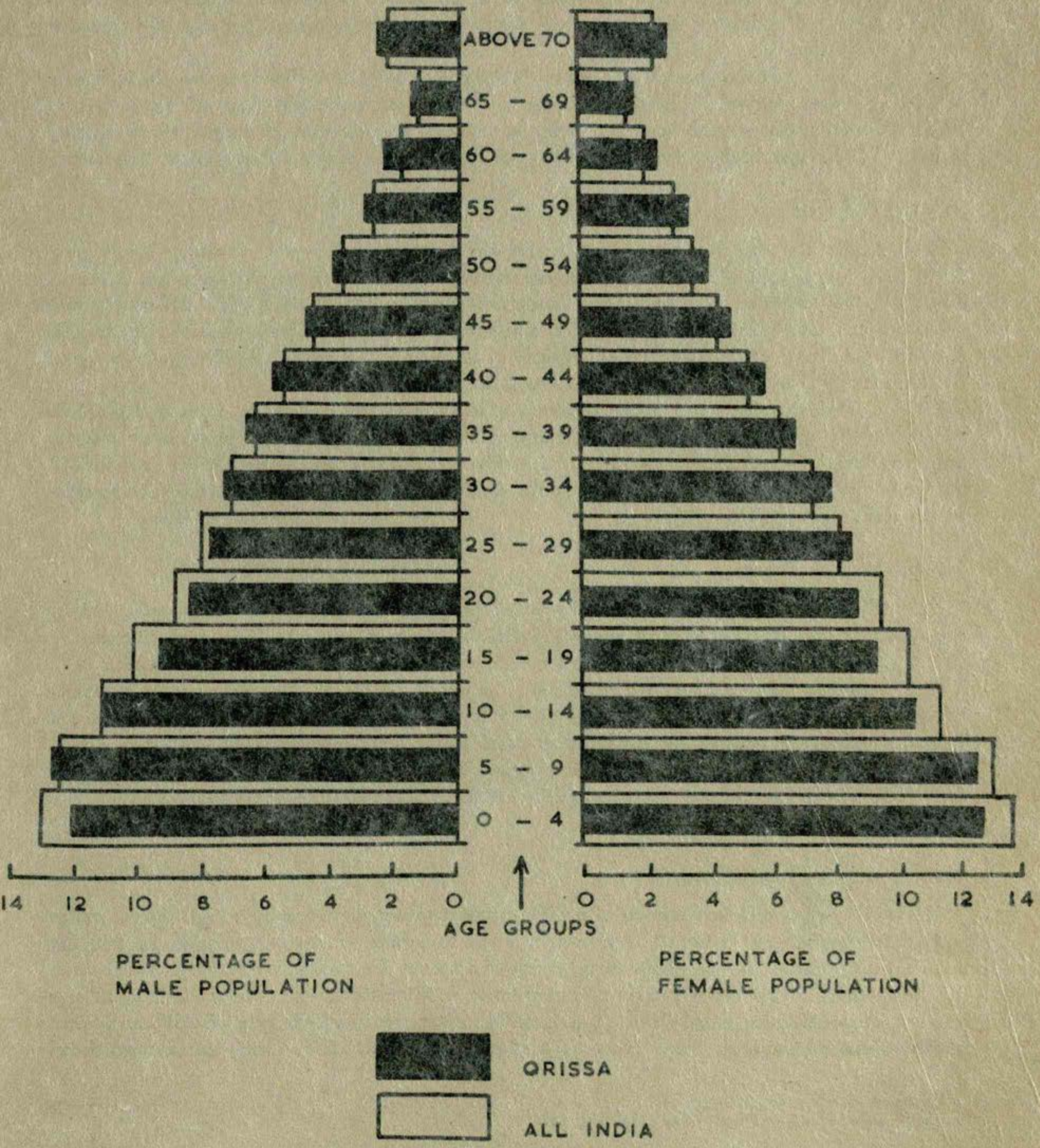
[2] The birth rate particularly is likely to have a large margin of error. While death rates have gone down, there is little reason to expect a similar fall in birth rates. Taking an average of 1951-57, it is found that birth rate in Orissa (based upon only reported births) declined to 27·3 as compared to 24·2 for all-India. The death rate (based upon only reported deaths) declined to 17·5 as compared to the all-India figure of 13·0 for the same period. This gives a survival rate of 10 or about one per cent rate of increase of population in Orissa, which is very low, considering the 1·99 per cent rate of increase actually recorded during 1951–61.

[3] Director General of Health Services, Government of India.

[4] This rate is arrived at by assuming the birth rate in the decade, 1951–61 to have remained unchanged (41·8), and deducting from it the rate of increase in Orissa's population (19·9 per 1000), during the same decade.

CSL

FIG PERCENTAGE DISTRIBUTION OF POPULATION BY AGE GROUPS IN ORISSA & ALL INDIA – 1951



SOURCE: Census of India, paper no. 3, 1954.

and about 60 per cent of total deaths in the State. Water-borne diseases like dysentery, diarrhoea and other intestinal ailments, and cholera account for about 11 per cent of the deaths due to major diseases. Respiratory diseases account for most of the remaining 8 per cent of deaths due to major diseases.

13.6 Statistics of cause specific death rates (Tables 68 and 69) show that in Orissa, the incidence of fever (including malaria), intestinal diseases and small-pox is the highest in all the States of India. Orissa ranks second in the severity of cholera and seventh in regard to respiratory diseases. It has the highest recorded death rate from all the major diseases taken together.

Regional Variations

13.7 Malaria is the most prevalent in the forest tracts and swampy areas. The highest death rates due to different types of fever are recorded in the districts of Kalahandi, Bolangir, Keonjhar, Mayurbhanj, Cuttack, Dhenkanal and Sundergarh (Table 70). Dysentery and diarrhoea are most marked in Puri district, Khondmals (Phulbani), Ganjam plains and Cuttack, Balasore and Puri. The incidence of respiratory diseases is the highest in Koraput, Puri and Sambalpur districts. (Maps 20, 21, 22, 23 and 24)

13.8 Considering the rural urban differential in the incidence of major diseases, malaria is pre-eminently a rural disease, while dysentery, diarrhoea, cholera, and respiratory diseases have relatively much higher incidence in the urban areas. A similar differential is found in the rest of India, but both the rural and urban incidence in Orissa is higher than in the country as a whole. (Table 71)

The Health of the People

13.9 The mortality figures do not fully reveal the poor state of health of the people. Many persons who suffer from the major diseases find their health shattered. Malaria lowers the general vitality of the victims, and so do dysentery, diarrhoea and other intestinal ailments.

13.10 Among other diseases leprosy affects between 170,000 to 200,000 persons annually in the State.[1] It is estimated that about 3·5 million persons suffer from filaria,[2] mainly in the coastal districts. A sample survey indicates that about 50,000 persons are victims of tuberculosis. In addition, Orissa has a large number of persons suffering from nervous disorder. In 1955 over 150,000 persons were treated for such disorders in the Government hospitals and dispensaries.

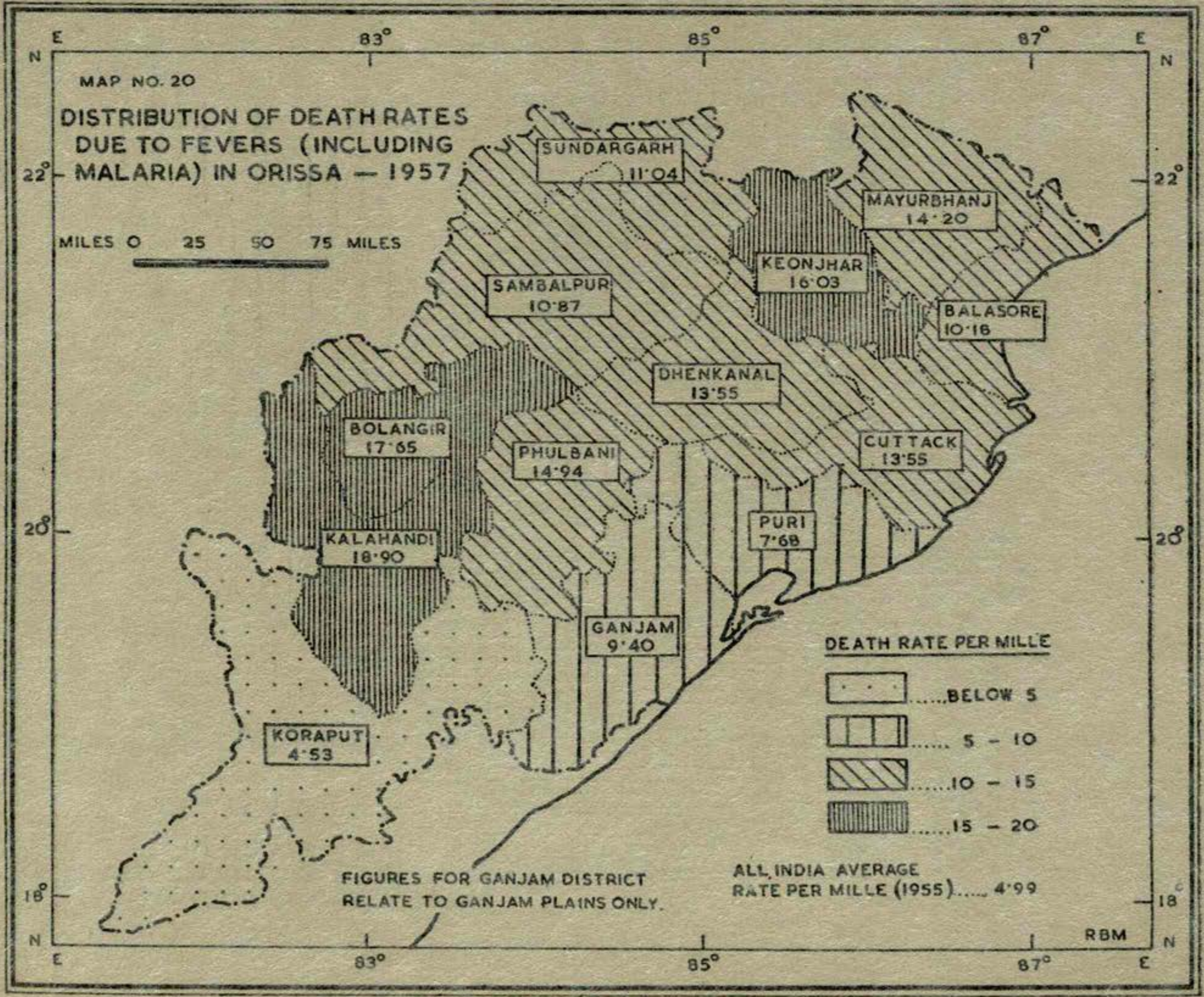
Economic and Social Implications

13.11 The economic implication of a high death rate accompanied by a high rate of infant and adult mortality, as is found in Orissa, is a loss to society of investment made in bringing up the young ones who die before they can participate in the productive activity. Such losses can be reduced by measures aimed at minimizing death rates in the young and adult age groups. Apart from economic losses, the social consequences of a high rate of child and adult mortality are also serious. The death of a child or an adult in a family causes emotional

---

[1] *A Handbook of Orissa* (*1958*), p. 173.

[2] *Draft Second Five Year Plan: Orissa* (*1955*), p. 181.



MAP NO. 20

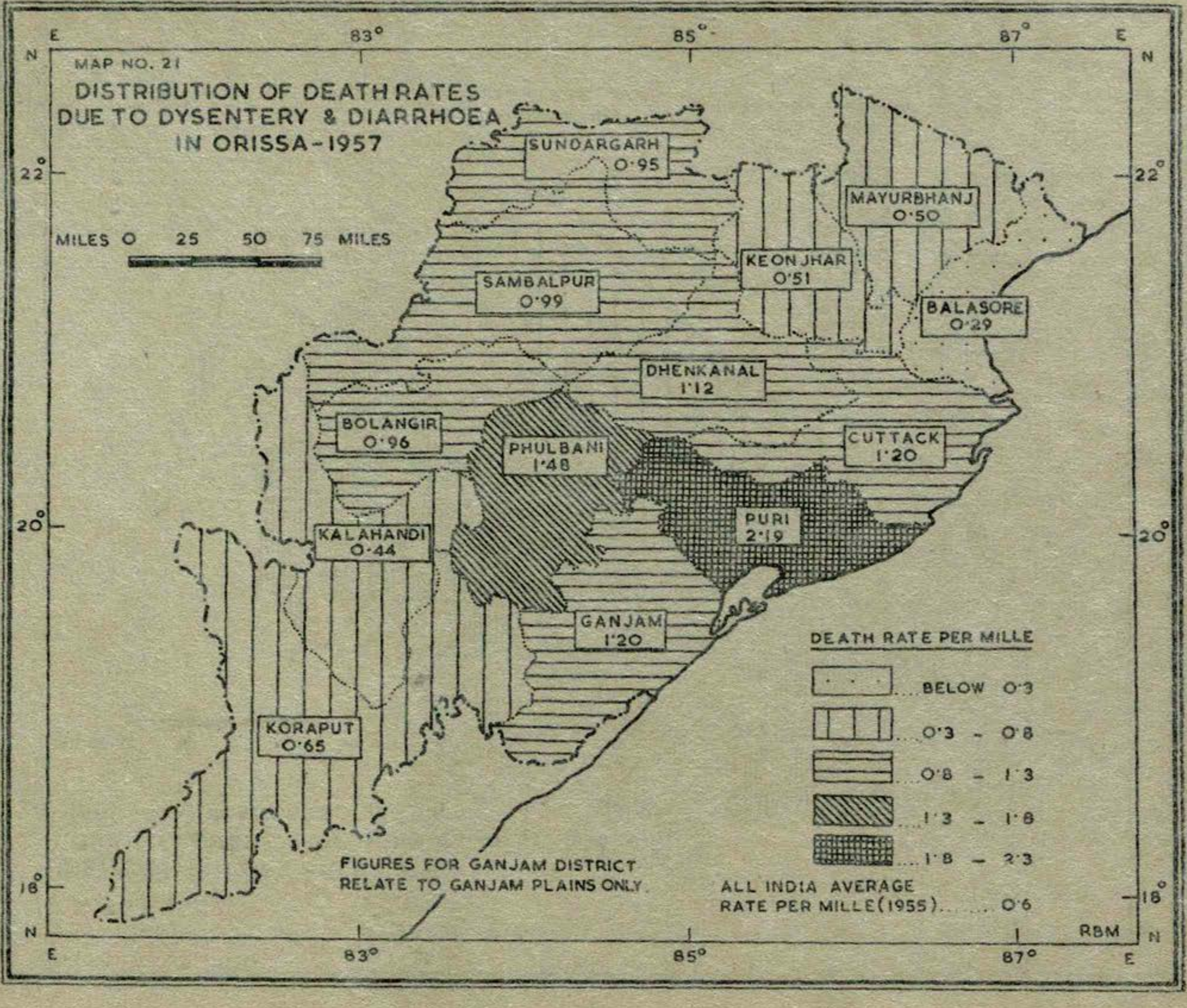
DISTRIBUTION OF DEATH RATES DUE TO FEVERS (INCLUDING MALARIA) IN ORISSA — 1957

DEATH RATE PER MILLE

⁘	BELOW 5
▥	5 - 10
▧	10 - 15
▦	15 - 20

FIGURES FOR GANJAM DISTRICT RELATE TO GANJAM PLAINS ONLY.

ALL INDIA AVERAGE RATE PER MILLE (1955)...... 4·99



MAP NO. 21

DISTRIBUTION OF DEATH RATES DUE TO DYSENTERY & DIARRHOEA IN ORISSA - 1957

FIGURES FOR GANJAM DISTRICT RELATE TO GANJAM PLAINS ONLY.

ALL INDIA AVERAGE RATE PER MILLE (1955)....... 0·6 disturbances among members of the family and would, in the long run, tend to inculcate in the community at large a fatalistic attitude towards life and work.

Productivity

13.12 Since the high mortality is combined with widespread prevalence of diseases, those who survive frequently suffer from serious ailments. The working adults so affected are not only incapacitated for long periods, but on account of lowered vitality, they also become less productive during convalescence. Productivity of the working force in high death rate areas is, therefore, usually low. However, it is not possible to establish any exact correlation between poor health standards in an area and the major economic variables such as per capita income and labour productivity in agriculture, mining and industry because these variables depend also on resources and economic structure. Despite this limitation it is significant to note that, in all the major sectors of the economy, per worker productivity in Orissa is lower than in all-India.

13.13 The productivity of agricultural workers in Orissa in 1951 was estimated as Rs. 394 per worker or about 17·4 per cent lower than the all-India average of Rs. 465. This may be partly connected with the prevalence of malaria. The Census Report (1951) observes[1] that the disease has a considerable adverse effect on foodgrain production.

13.14 In 1956 the productivity per worker in factory industry as well as in small scale and cottage industry was about 30 per cent lower than the all-India average. The extent to which this difference is due to poor health cannot be estimated; but there is no doubt that the high incidence of fatal and disabling diseases is partly responsible for low productivity in Orissa.

13.15 A rapid decline in death rate would reduce the economic loss to the society resulting from early deaths, but will aggravate the problem of unemployment and under-employment. However, in Orissa, where resource exploitation has so far been inadequate, the solution of the unemployment problem must come mainly through increased production, rather than through a neglect of the health problem and the perpetuation of a high death rate.

13.16 The objective in Orissa, therefore, should be to achieve the quickest possible improvement in health standards. The basic causes of poor health are low income and dietary deficiencies, absence of protected water supply and modern drainage systems, and lack of sufficient medical and public health facilities. Health standard can be raised only by tackling these factors effectively.

Remote Causes: Dietary Deficiencies

13.17 Low per capita income and nutritionally deficient diet are known to be the most significant causes of poor health. Low income leads to poor diet, and poor diet, through poor health, causes low income. However in Orissa, low incomes are not so much a consequence of existing poor health standards as of inadequate resource utilization.

13.18 The dietatic pattern of the people of Orissa is ill-balanced and lacking in several nutrients. Because of low per capita income, per capita expenditure[2] in rural areas of Orissa is the lowest among all the States—Rs. 15·02 per month as compared to the all-India average of Rs. 27·81 (Table 72). Because of poverty, the proportion of foodgrains consumption (mainly cereals) is relatively high. In Orissa foodgrains account for 47·6 per cent of total consumption expenditure, whereas the all-India percentage is 34·6. The per capita consumption of milk and milk products in Orissa is about one-tenth of the all-India average. From Table 73 it is evident that there is excessive consumption of cereals in Orissa as compared with standard requirements and the all-India average, and large deficiency in all other types of food.

---

[1] *Census of India, 1951;* Orissa Part I—Report, pp. 107 and 108.

[2] National Sample Survey Report, Fourth Round.

13.19 The Board of Scientific and Industrial Research, Orissa, made a Poorman's Diet Survey in the urban areas in 1951-52. The diet indicated a deficit of 500 calories over the standard requirement of 2,400 calories per adult, and a 20-per cent deficiency in protein content. In addition there was lack of vitamins A, B and C, and of calcium. These deficiencies lower the resistence of the body to disease and lead to general debility, low vitality and stunted growth.

13.20 A survey conducted recently (1960) in select development blocks also corroborates the findings of the earlier surveys with, however, one difference. There was no dearth of calories in the diets; on the contrary, in all the blocks except two (in Dhenkanal and Koraput districts) the average adult diet contained more calories than the standard requirements of 2,400 calories. This is apparently due to excess consumption of cereals, specially by the large number of farmers, who were covered by these surveys. Consumption of other nutrients like proteins especially of animal origin, calcium, iron, vitamins A, B and C was very much below the standard. (Table 73)

Sanitation and Drainage

13.21 Practically all the urban areas of Orissa lack modern sanitation and drainage facilities, and with the exception of Cuttack, Bhubaneshwar, Sambalpur and six other towns, the remaining 31 towns do not have a protected water supply. This results in high incidence of dysentery and diarrhoea and other water-borne diseases. With the proposed programme of industrial growth it is very important to provide modern water supply and sanitation facilities in all the urban areas in Orissa.

13.22 In 1956, for every 100,000 persons Orissa had eight doctors, two nurses and two midwives as against 19 doctors, six nurses and seven midwives in all-India (Tables 74 and 75). In 1955-56 there were 27 hospitals and dispensaries per million people as against 29 in all-India, but the number of hospital beds per million persons was 200 compared with 320 in all-India.

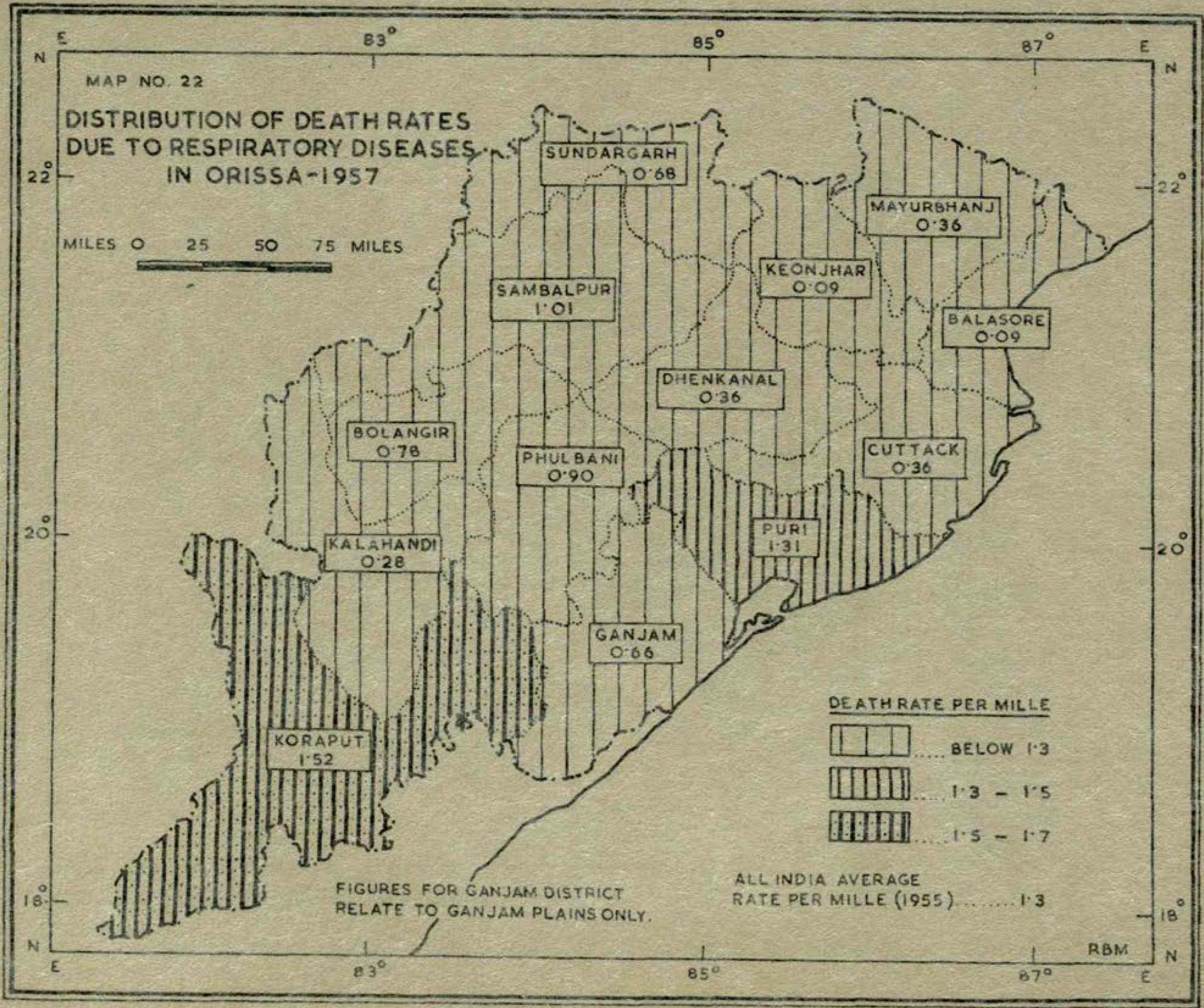
Medical and Health Facilities

13.23 Medical and health facilities are, thus, very poor in Orissa. This is partly due to the fact that nearly a third of the present area of the State was formerly under princely States, where, with a few exceptions, facilities were poorer. In addition, there was little provision for the large tribal population.

Plan Allocation

13.24 Despite these facts the per capita allocations in the First and Second Five Year Plans of Orissa for medical and public health programmes were Rs. 1·45 and Rs. 2·45 respectively—about one-third of the all-India averages—and were the smallest among all the States (Table 76). Small allocations for public health are largely due to the paucity of financial

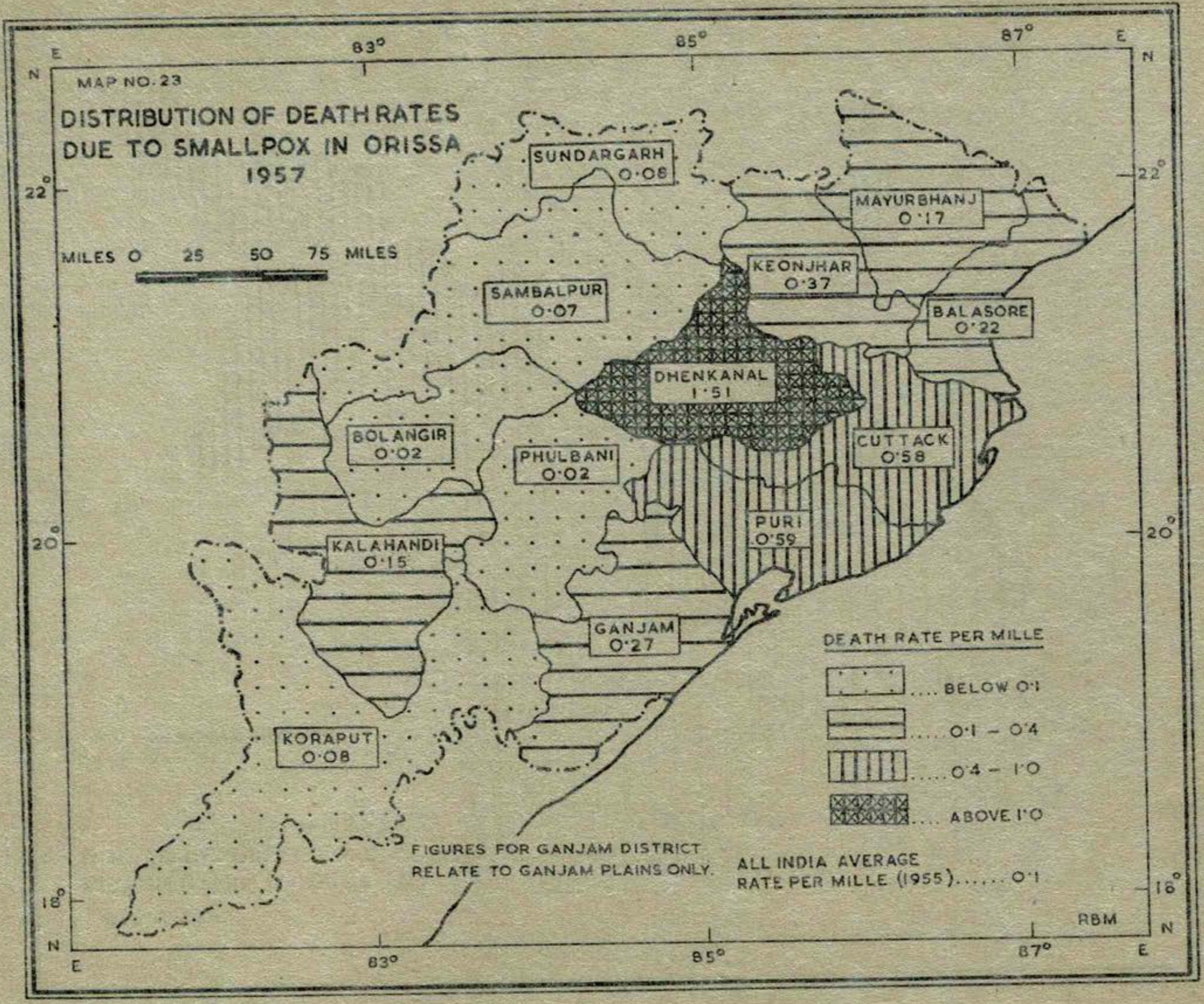
MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL



MAP NO. 22

DISTRIBUTION OF DEATH RATES DUE TO RESPIRATORY DISEASES IN ORISSA-1957

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL



MAP NO. 23

DISTRIBUTION OF DEATH RATES DUE TO SMALLPOX IN ORISSA 1957

GSL

resources in the State and also due to the implementation of Central Schemes such as National Malaria and Filaria Control. But the severity of the health problem in Orissa calls for a much greater effort.

13.25 Over and above the low level of expenditure on public health, there is the inadequacy or absence of certain types of schemes in the health programmes of Orissa. The total allocation of Rs. 110 lakhs for controlling malaria, filaria, tuberculosis and leprosy is quite inadequate considering the high incidence of these diseases. Another gap is the total absence of any provision for urban sanitation. The need for preventive measures, e.g., mass vaccination against smallpox, and the supplementing of dietary deficiencies by arranging the supply of free or subsidized vitamins and milk, etc., have also not been sufficiently emphasized.

Personnel

13.26 Facilities for training medical and health services personnel also fall short of the requirements. In the Second Plan, provision was made for training 150 doctors, 60 nurses, 160 pharmaceutists, 200 *dais* and 359 health inspectors. It is estimated (Table 77) that in order to reach the all-India average level of health facilities by 1971, Orissa will require additionally about 2,800 more doctors, 3,500 nurses, 3,600 midwives, 3,400 *dais*, 670 health inspectors and 1,000 compounders.

General Education

13.27 Early improvement in health standards is also dependent upon the spread of general education. This helps people to abandon taboos and superstition, and suspicion and fear of modern medicines and medical and health measures, and to appreciate the importance of personal hygiene and health care. Orissa is, however, lagging behind in facilities for general education. By 1960-61 only 50 per cent of the population aged 6 to 11 years (all-India 62·5%) and 11 per cent in the age group 11-14 (all-India 22·52%) are expected to go to schools in Orissa. The general education facilities thus stand in need of more rapid expansion than is being planned so far.

SUGGESTIONS

13.28 It has been seen that the health of the people of Orissa is much poorer than of those living in most of the other parts of India. In the next decade, Orissa is also expected to experience large scale industrial growth, and poor health standards will be a big obstacle to such development. Both on economic and humanitarian grounds there is, therefore, urgent need for a big health programme. It is suggested that in the future plans the per capita allocation should be brought up to the all-India level. The all-India per capita allocation for the Third and Fourth Plans is estimated to be Rs. 10·5 and Rs. 16 respectively. On this basis the public health programme in Orissa should receive an allocation of Rs. 19·3 crores during 1961–66 and of Rs. 32·5 crores during 1966–71. Considering the slender financial resources of the State and the fact that the total allocation during 1956–61 was Rs. 5·5 crores, the target appears high. However, the need is urgent, and utmost efforts should be made to find the required finance. It is suggested that an allocation of Rs. 49·7 crores may be made in the following manner.[1]

---

[1] The basis for the estimates of allocations is indicated in Appendix I.

Malaria Control

13.29 Malaria eradication should be given top priority and accomplished as quickly as possible. A large ground has already been covered in this field. In 1959, 14 malaria control units covering the entire population of the State were working. The spleen rate came down from 25 to 30 per cent in the pre-Plan period to about 5 per cent. An expenditure of about Rs. 50 lakhs may be provided for intensifying the operations, of which the State Government share may be Rs. 10 lakhs, the remainder being provided under the National Malaria Control Programme.

13.30 The supply of quinine, both for preventive and curative purposes, should be ensured for the entire population of the State. An annual provision of Rs. 3 or Rs. 4 lakhs may be required for this purpose, i.e., Rs. 40 lakhs over the decade 1961–71.

Filaria Control

13.31 Filaria being a mosquito-borne disease should also be brought under control as anti-malarial work progresses, but other aspects of the National Filaria Control Programme should go on according to Central Plans. It is estimated that the cost during 1961–71 would be about Rs. 60 lakhs.

13.32 All existing and new cities and towns should be provided with protected water supply, and modern sanitation and drainage system to control water-borne diseases. Municipalities should be established and strict food laws be made applicable in all towns.

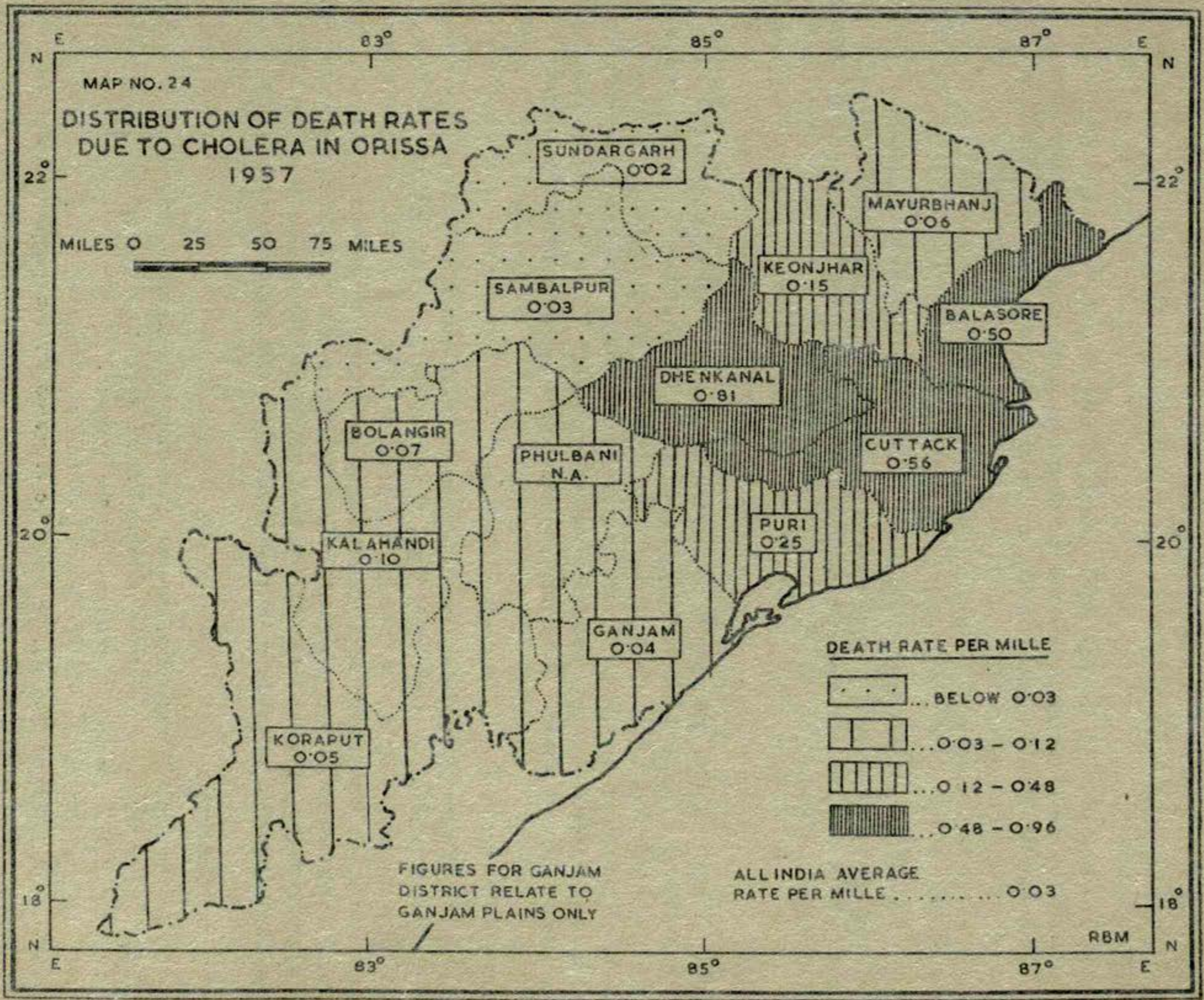
Water Supply and Drainage

13.33 It is estimated that the urban population of Orissa will increase from an expected one million in 1960-61 to about 2·5 million in 1971. The provision of protected water supply and modern drainage system is very expensive and it will not be possible in the next decade to provide these facilities to all the urban population. However, it is suggested that the facilities may be extended to cover at least one million of the expected urban population by 1971. Priority should be given to those towns in which large scale industrial development in the next ten years is envisaged, viz., Cuttack, Puri, Rourkela, Bonaigarh, Rayagada, Rajgangpur, Brajrajnagar, Hirakud and Jeypore. The cost of providing protected water supply to one million people may be estimated at about Rs. 3 crores, and that of modern drainage and sanitation facilities at about Rs. 14·4 crores. If industrial growth is to be placed on a firm basis, investment in such overheads is essential.

13.34 The extension of protected water supply and sanitation to rural areas is less urgent because of the urban concentration of water-borne diseases. However, the rural programme must go on according to the rates visualized in the all-India Plans. The estimated allocation may be about Rs. 70 lakhs in the Third Plan and Rs. 1·05 crores in the Fourth Plan, i.e., Rs. 1·75 crores over the decade 1961–71.

Mobile Health Units

13.35 An inoculation and vaccination programme in the rural areas through mobile health units at the rate of one unit per each of the 13 districts, should also be organized in the Third



MAP NO. 24

DISTRIBUTION OF DEATH RATES DUE TO CHOLERA IN ORISSA 1957

GSL

Plan. The number of units could be doubled in the Fourth Plan. The approximate total outlay would be about Rs. 15 lakhs during 1961–71.

Tuberculosis Control

13.36 The control of TB through BCG campaign appears to be extensive. There is, however, need for increased sanatoria facilities and these should be expanded. It is suggested that Rs. 60 lakhs and Rs. 90 lakhs should be provided for this purpose in the Third and Fourth Plans respectively.

Leprosy Control

13.37 Periodic surveys should be carried out to collect information on the incidence of leprosy. An intensive programme for the segregation of infectious patients into special colonies is also required. The outlay on anti-leprosy measures should be about Rs. 70 lakhs in 1961–66 and Rs. 1·05 crores in 1966–71.

Personnel

13.38 A large training programme is urgently required to reduce the present scarcity of medical personnel. On the basis of all-India allocation of Rs. 2 per head for medical education and training in the Third Plan, Orissa should spend about Rs. 3·6 crores for this purpose during 1961–66. This amount should be doubled for the Fourth Plan considering the present small allocation and the need for a large number of trained personnel. The total provision for 1961–71 would thus be Rs. 10·8 crores. Even this may not fulfil the need for trained personnel.

Primary Health Units

13.39 The objective should be to have 2,100 primary health units by 1971 at the rate of one unit for every 10,000 people. In the Second Plan, 27 units are to be established at a cost of Rs. 58 lakhs. It is suggested that the cost should be reduced to about Rs. 1 lakh per unit, by cutting down construction expenditure and concentrating on preventive measures. Since the gap between the present and the required number is very large and the cost of the programme high, it is suggested that by 1971 at least 1,000 units should be established at a total cost of Rs. 10 crores. This implies a programme to train about 100 health inspectors every year.

Hospitals and Dispensaries

13.40 During 1961–71 additional hospital and dispensary facilities with about 3,500 beds are likely to be required. If construction expenditure is kept at a minimum, an outlay of Rs. 5 crores during 1961–71 would be required for this purpose.

13.41 An extensive health publicity campaign should be carried out to make the people health conscious. It is suggested that Rs. 50 lakhs be allocated for this purpose during the period 1961–71.

Vital Statistics

13.42 It is also necessary to improve the range and quality of vital statistics in Orissa. A

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

well organized system of data collection will increase the efficiency of all aspects of the public health programme. During 1961–71, Rs. 50 lakhs may be provided for this purpose.

13.43 In addition, other programmes such as maternity care, child welfare and family planning should be continued in accordance with the currently accepted criteria. A sum of Rs. 45 lakhs may be allocated to these heads over the next decade.

Dietary Deficiencies

13.44 The standard of health can also be improved if the existing nutritional deficiencies are corrected. With the implementation of the proposed programme of industrial and agricultural development, the per capita income will rise during the next decade. Also the production of pulses, vegetable oils, milk and milk products will increase. It may be expected, therefore, that these developments will reduce the prevailing dietary deficiencies. In addition, a selective programme for reducing existing deficiencies may be considered. Multi-vitamin tablets, fish liver oil capsules, and milk, if supplied to school children, should improve the standard of health. However, the expenditure involved is very large and the benefits may not all be realized. Two multi-vitamin tablets per day per school child may cost about Rs. 80 lakhs a year. It is, therefore, suggested that experiments be organized in the Third Plan and schemes for wider coverage prepared for the Fourth Plan if the experiments give encouraging results. The fund for the experiments may be obtained through such agencies as the WHO and UNICEF or through social welfare and charitable institutions.

Size and Pattern of Allocations

13.45 The programme outlined above would mean a total outlay of Rs. 49.7 crores on health plans during 1961–71 (Table 78). About 7 per cent of this is to be spent on control of major diseases, 35 per cent on protected water supply and modern drainage facilities, 21 per cent on the training of medical personnel, 20 per cent on the primary health units and 8·7 per cent on additional hospitalization facilities.

Investment and Employment Potential

13.46 Apart from equipment for hospitals and dispensaries and medical colleges, the main investment components of the programme relate to construction which, despite the suggestions to keep it at a minimum, is estimated to account for Rs. 26·75 crores or 55 per cent of the total outlay (Table 79). Direct employment potential of the proposed outlay is estimated to be about 30,000, half of which would consist of skilled personnel (Table 80). In addition to this, an annual average employment of 7,000 to 8,000 persons may be provided in the construction required. About a third of these may be skilled men, e.g., masons, carpenters, engineers. The total employment potential is thus about 37,000 of which about 17,000 will be skilled men. The realization of this potential, however, depends on the effectiveness with which the proposed schemes for training medical personnel are carried out.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

Chapter 14

Financial Resources

Present Budgetary Position

FROM MANY POINTS of view, Orissa is probably the most backward region in the country. The poorer a region, the more urgent is the need for accelerating growth, but the greater also is the difficulty in raising internal resources for investment. The experience of the Orissa Government in implementing the Second Plan has highlighted the problem of inadequate resources. The Plan expenditure by the State during the Second Plan period is estimated to be about Rs. 91·1 crores.[1] Contribution from the State's resources (including its share of small savings) to this expenditure was as follows:

Revenue Account	Rs. 10·88 crores
Capital Account	Rs. 10·70 crores

Thus the contribution of the State has been only Rs. 21·58 crores out of the total outlay of Rs. 91·1 crores. Even this has been made possible only as the result of non-Plan assistance by the Centre. Such assistance was largely responsible for arresting the continuing decline in the cash balances of the State. The opening balance in 1956-57 was Rs. (–) 1·07 crores and the year closed with a minus balance of Rs. 4·02 crores. That year the Government had to incur extra expenditure on relief on account of floods and drought in different areas. But even in the following year there was deterioration in the financial position, the closing balance for 1957-58 being Rs. (–) 4·48 crores. However, the year 1958-59 closed with a balance of Rs. 1·85 crores. The Government was also able to clear the overdraft on the Reserve Bank of India. This was made possible partly through long term loans from the Centre,[2] and partly through efforts by the State to collect arrears and raise the rates of taxes.

14.2 It must also be remembered that the awards of the Second Finance Commission came into force in the second year of the Second Plan. The resources thus obtained plus the other assistance referred to above enabled the State to carry through the programme envisaged in the Second Plan. As against the planned outlay of Rs. 99·98 crores, the actual expenditure is estimated to be Rs. 91·1 crores. However, in 1960-61 there was a recurrence of deficit on revenue account. Moreover, the State would find itself saddled with higher committed expenditure at the end of the Plan period when Central assistance for Plan schemes ceases. Thus the problem of resources will become more, and not less, acute in the coming years.

14.3 A comparative statement of the revenue position of the States in 1957-58 is given in Table 81. In 1957-58, per capita revenue from State taxes in Orissa was Rs. 4·07. This figure is the second lowest in India, the lowest being Jammu and Kashmir's at Rs. 2·04—shared taxes as a percentage of tax revenue was 40·98 in Orissa, the second highest in the Union, the lowest being as low as 20 for Assam and Bombay. Union grants as a percentage of total revenue was

---

[1] Government of Orissa, *Third Five Year Plan, A Draft Outline.*

[2] Rs. 1·5 crores as Miscellaneous Development Loan and Rs. 3·5 crores for Relief Works.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

27·70 in Orissa—the third highest among the States. Per capita Union grants was the fifth highest at Rs. 3·73.

14.4 Nevertheless, per capita total revenue for Orissa was the lowest among the States. This is partly a reflection of the very low per capita income of the State which comes in the way of greater tax effort. It may, however, also reflect the rigidity of the State tax system resulting from an undue dependence on inelastic sources of income like Land Revenue. The ratio of revenue from State taxes to State income was 1·6 per cent in 1956-57. A comparison with a few States is given below:

PER CAPITA REVENUE, REVENUE FROM STATE TAXES AND INCOME IN SELECTED STATES
(in rupees)

	Assam (1956-57)	*Madras (1955-56)*	*Andhra Pradesh (1955-56)*	*Madhya Pradesh (1956-57)*	*Bihar (1953-54)*	*Orissa (1956-57)*
1. Per Capita Income	290	227	227	248	208	207
2. Per Capita Revenue	23·57	16·19	11·93	18·73[a]	8·28	10·50
3. Per Capita Revenue from State Taxes	11·84	8·33	7·07	7·59[a]	3·90	3·40
4. (3) as a percentage of (1)	4·09	3·66	3·11	3·06[a]	1·90	1·64

[a] Figures are for 1957-58.
NOTE: Per capita figures have been computed on the basis of the NCAER population projections.

14.5 Not only is per capita revenue from State taxes the lowest in Orissa, but the ratio of State taxes to State income is also low compared to the other States. In 1957-58, the total of revenue from State taxes for all States works out to 3·1 per cent of the National Income; this all-India average is much higher than the corresponding figure of 1·6 for Orissa in 1956-57. This may be taken to indicate a relatively low tax effort in Orissa.

Trends in Revenues

14.6 Table 82 shows the trends in revenues from different sources. Total revenue has increased from Rs. 10·31 crores in 1950-51 to Rs. 38·54 crores in 1961-62 (R.E.)—an increase of about 280 per cent in 12 years. It is instructive to consider the relative rates of increase in the major components of revenue during this period.

RELATIVE INCREASES IN MAJOR COMPONENTS OF REVENUE BETWEEN 1950-51 AND 1960-61

Nature of the Source	(Rs. crores) *1950-51*	*Per cent of Total*	*1960-61 (R.E.)*	*Per cent of Total*	*Percentage of rise between 1951-61*
State Taxes	5·10	49·5	9·52	24·5	87
Shared Taxes	1·42	13·8	6·23	16·2	339
Grants from the Centre	1·16	11·3	13·04	33·9	1024
Other Sources of Non-tax Revenues	2·63	25·4	9·75	25·4	271
TOTAL	*10·31*	*100·0*	*38·54*	*100·0*	*274*

14.7 It is significant that while grants from the Centre have increased by 1,000 per cent and the share of Central taxes has increased by 340 per cent, the yield of State taxes has increased only by 87 per cent. This relatively low rate of increase must be considered against the considerable rise in prices, incomes and governmental expenditures that has taken place since 1949. It is clear that the yield of State taxes has not kept pace with the rapidly rising expenditure on development. In this period, while the share of Union grants has increased from 11·3 per cent to 33·9 per cent of total revenue and the proportion of shared taxes from 14·2 per cent to 16·2 per cent, the share of State taxes has fallen from 49·5 per cent to 24·5 per cent. The State thus is now more dependent on grants and shared taxes than at the beginning of the First Plan. In a State which is as yet predominantly agricultural, with a relatively under-developed industrial and commercial sector and a small urban population, the tax system must be capable of adequately reaching the rural sector. The tax system of Orissa has to be examined from this point of view. Also, changes must be introduced that will render the system capable of providing increasing revenues commensurate with rapid economic development that is already taking place in this region of India richly endowed with natural resources.

14.8 Though the revenue from State taxes as a whole has shown an increase of only 60 per cent or so, a few of the taxes have proved to be elastic sources of revenue—elastic with reference to rate and price changes—as will be seen from the following table:

RELATIVE INCREASES IN THE REVENUE FROM SELECTED STATE TAXES BETWEEN 1950-51 AND 1960-61

(Rs. crores)

Description of the Tax	*1950-51*	*1960-61 (R.E.)*	*Percentage Increase between 1951-61*
General Sales Tax	0·80	2·53	216
Land Revenue	1·03	3·14	248
Motor Vehicles Tax	0·11	0·79[a]	618
Sales Tax on Motor Spirits	0·13	0·37	177
Entertainment Tax	0·06	0·14	133

[a] Part of the increase is due to the fact that the Motor Vehicles Tax previously collected in the form of stamps in South Orissa is collected in cash since 1954-55.

14.9 The increases of revenue under different tax heads have taken place as a result of wider coverage, increases in rates and price and income changes. It can be legitimately expected that in the future these sources of revenue will yield progressively greater amounts and will form the main bulwark of the State tax system. Even Land Revenue will bring in more revenue as rents are standardized and lands as yet not assessed are brought under settlement. The changes that could be brought about in the tax system are discussed in a later section.

Trends in Expenditure: Functional Analysis

14.10 To get a really satisfactory idea of the growth of development expenditure relative to non-development expenditure, it is necessary to look at the total expenditure on Revenue and

Capital Accounts. For this purpose, a functional analysis of the budget accounts for 1951-52 and 1957-58 was carried out (Table 83). In this analysis, expenditures were classified under certain functional categories, regardless of where particular items were shown in the budget. Also, mere accounting transactions and internal transfers were eliminated so that the final figures reflect only real expenditures by the Government. The results of the analysis are presented in Table 83. In 1957-58, developmental expenditure formed 62·8 per cent of the total expenditure. Among the various developmental items, Irrigation, Civil Works (Construction), Electricity and Education account (in that order) for a high proportion of the total. Developmental expenditure as a whole has fallen from 75 per cent of the total in 1951-52 to 62·8 per cent of the total in 1957-58, though the absolute amount spent on developmental heads has increased by about 95 per cent. Broadly speaking, the relative shares of Education, Electricity, Civil Works and Industrial Development are greater in 1957-58 than in 1951-52, while the share of Irrigation has fallen from 37 per cent to 13·5 per cent of the total. Education absorbs (in 1957-58) 7·4 per cent of total expenditure while Medical and Public Health absorbs only 2·9 per cent which seems to be rather low in view of the needs of this region for health facilities.

14.11 While development expenditure (as noted above) has increased by 95 per cent, non-development expenditure has increased by as much as 247 per cent, raising the share of the latter category to 37 per cent of the total in 1957-58 from 25 per cent in 1951-52. It is interesting to consider the causes for this greater rise in non-development expenditure. The rise in the cost of collection of taxes and in the cost of civil administration has been quite modest. The relative shares of these two items have actually fallen—from 2·3 to 1·4 per cent and from 16·1 to 9·8 per cent, respectively. The three items that account for the bulk of the increase in non-development expenditure are payment of interest, repayment of debt and outlay on State trading. Since the figure for State trading is a net figure, its magnitude can vary greatly from year to year. But interest payment and debt repayment will show a steady tendency to rise with greater borrowing for public investments. Interest payment has increased from Rs. 50 lakhs in 1951-52 to Rs. 3·74 crores in 1957-58;[1] and repayment of debt from Rs. 36 lakhs to Rs. 3·78 crores. The two together increased their share of total expenditure from 4·1 per cent to 15·7 per cent. It is clear that the increase in these items of committed expenditure will account for a considerable part of the rise in non-development expenditure in the coming years.[2] The State Government has to examine the whole question of the management of its debt. The payment of interest has to be set against the receipt of interest and the income from Government investments. When this is done, interest payments are seen to constitute about 15 per cent of current revenues other than income from investments. This in itself will constitute a strain on revenues. Moreover, mounting repayment obligations may prove embarrassing unless the liquidation of public debt is planned wisely and sufficiently in advance. It would be desirable for Orissa to build up regular sinking funds for a high proportion of its public debt. Only then can fresh borrowing be used for further productive investment. On the other hand, it seems unlikely that a major part of the present repayment obligations can be met out of current revenues. It is this situation that calls for an examination of the entire debt position of Orissa.

14.12 Between 1951-52 and 1957-58, current revenues of Orissa Government increased by

---

[1] Interest payment is included in non-development expenditure, because it does not represent development expenditure undertaken that year.

[2] Includes all interest paid *minus* that recovered from the Andhra Pradesh.

GSL

Rs. 10·04 crores. In the same period what may broadly be called current development outlay, increased by Rs. 7·42 crores. Thus the rise in current development outlay itself has absorbed the major part (74%) of the increase in current revenues. Even if current non-development expenditure had not increased at all, only 26 per cent of the rise in revenues would have been available for capital expenditure. This trend is likely to continue, since it is the responsibility of the States to meet recurring expenditures on completed Plan schemes and provide social services on a larger scale as years pass by. Therefore, very little of saving (current revenues—current expenditure) will be left for public investment, even if administrative expenditure is prevented from rising. Investment by the State will have to depend primarily on borrowing and hence on private saving. To some extent the State Government can rely on Central loans but even this depends partly upon the mobilization of small savings in the State.[1] It is, therefore, incumbent on the State Government to promote savings to the greatest extent possible.

FINANCING OF THE PLANS

First Plan

14.13 A total expenditure of Rs. 17·84 crores was originally provided for in the First Five Year Plan of Orissa. This figure was stepped up subsequently to Rs. 21·23 crores on account of a few additions and adjustments. As against this revised target of Rs. 21·23 crores, the actual expenditure during the five-year period is estimated to have amounted to Rs. 18·31 crores, indicating a financial achievement of about 94 per cent.

14.14 The contribution from budgetary resources to Plan expenditure was Rs. 11·6 crores—Rs. 2·2 crores on Revenue Account and Rs. 9·4 crores on Capital Account. With the Central assistance of Rs. 10·6 crores, the amount contributed by the State was more than sufficient to meet the programmed expenditure so that there was a net reduction in floating debt and an addition to cash balances. These results should not lead one to suppose that the financial position was quite satisfactory and equal to the needs of planned development. The comfortable margins with which the Government could operate were due more to the smallness of the outlay that could be undertaken than to an elastic resource structure. When the level of expenditure was stepped up during the Second Plan period, financial stringency was immediately experienced.

Second Plan

14.15 The Plan ceiling for the State was fixed at Rs. 99·98 crores for the five-year period. The actual expenditure is likely to be of the order of Rs. 91·1 crores. The State's contribution to Plan outlay was fixed in consultation with the Planning Commission at Rs. 10.5 crores—Rs. 2·8 crores on Reserve Account and Rs. 7·7 crores on Capital Account. The gap between the Plan outlay and the State's contribution would have been Rs. 89·5 crores. The State has actually contributed Rs. 21·58 crores—Rs. 10·88 crores on Revenue Account and Rs. 10·7 crores on Capital Account over the Second Plan period. Thus the State has been able to contribute more than double of what was envisaged at the beginning of the Plan, though it is apparent that the major part of the finance required came from the Centre.

---

[1] Because two-thirds of the collections in a State are allotted to that State.

14.16 Though the State's contribution per year is higher in the Second than in the First Plan period, it has not risen proportionately with the rise in Plan expenditure. Thus the contribution by the State formed 63·4 per cent of total First Plan outlay, whereas it formed only 23·7 per cent of total outlay in the Second Plan. Again, as pointed out above, even contributions of this order would not have been possible without the additional resources transferred from the Centre under the award of the Finance Commission and as long term non-Plan loans. The State cannot hope to carry through a large scale programme of development unless considerable changes are introduced in its fiscal system.

FINANCE FOR FUTURE DEVELOPMENTS

Taxation

14.17 The trends in State taxation and non-tax revenues have already been discussed. It may be useful at this stage to say something about the structure of the State tax system and the composition of tax revenue. The composition of State taxes in 1950-51 and 1959-60 is given in the following table. All-India figures for 1959-60 are given side by side for purposes of comparison:

STRUCTURE OF STATE TAXES

(Rs. lakhs)

Name of Tax	*Orissa*				*All-India*
	1950-51		*1959-60*		*1959-60*
	Amount	*Percentage of total*	*Amount*	*Percentage of total*	*Percentage of total*
Land Revenue	103	20·2	237	30·9	24·3
States Excise	213	41·8	108	14·1	12·1
General Sales Tax	80	15·7	212	27·6	32·9
Sales Tax on Motor Spirit	13	2·6	30	4·0	9·6
Stamps and Registration	74	14·4	80	10·4	6·7
Motor Vehicles Tax	11	2·1	76	10·0	3·2
Entertainment Tax	6	1·2	12	1·6	2·2
Agricultural Income-tax	10	2·0	03	0·4	9·0
Other Taxes	Neg.	Neg.	8	1·0	Neg.
GRAND TOTAL	*510*	*100·0*	*766*	*100·0*	*100·0*

Neg. =Negligible.

14.18 As between 1950-51 and 1959-60, the relative shares of State excise, agricultural income tax and stamps and registration have fallen, while those of land revenue, general sales tax, sales

6
GSL

tax on motor spirit and motor vehicles tax have risen. The most striking change is the diminished reliance on liquor excise and the increased dependence on land revenue and commercial taxes. The fall in the receipts from excise is due to the extension of prohibition, and the fall in agricultural income tax is due to the abolition of zamindaris. For the same reason receipts under land revenue have increased considerably. It is not that land revenue rates have been raised; only what was formerly paid to the zamindars and other feudal proprietors has come to be paid to the State. The increase in receipts under commercial taxes is of an entirely different nature. It is mostly an automatic increase due to the growth of economic activity. Thus, motor vehicles tax receipts have increased because of the increase in the number of vehicles, though the rates also were enhanced in 1956-57.[1] The same is the case with the sales taxes. Summing up, it may be stated that the most significant change in the structure of the tax system is the emergence of the commercial taxes (accounting for 43·2 per cent of the total in 1959-60 as against 21·6 per cent in 1950-51) and the decline of State excise.

14.19 Though the general sales tax has become an important source of revenue in Orissa, compared with all-India, Orissa relies more on land revenue than on the general sales tax. Orissa has as yet only a small industrial structure and a small urban population relative to the total population. However, in the Third and Fourth Plan periods, a complex of industries is likely to grow up based on the mineral resources of the region and aided by the power generated from Hirakud and other schemes. In this situation, the fiscal structure must rely for some time to come on the taxation of the agricultural/rural sector. At the same time elements should be introduced into the structure which would enable the State to benefit from the subsequent growth of the secondary and tertiary sectors. Therefore, attention should at this stage be devoted both to the improvement of land taxation and the rationalization of the structure of commercial taxes.

14.20 The land revenue system of the present Orissa State has not yet become integrated and uniform. Even in the areas which formed the old Orissa State before the integration of the "Princely States", there are inter-district disparities in land revenue paid. The original Orissa districts (5) were resettled as far back as 1927. Settlement operations are now being conducted in the "Princely" areas. And it would seem that in the erstwhile zamindari tracts, land revenue collection is inadequate and in arrears. This may be due partly to inadequate administrative machinery and partly due to the absence of proper records of rights and ownership. In addition, there are lands that are as yet unassessed to land revenue though they have been brought under the plough, e.g., *Nayabadi* lands. In the result, some sections of land owners are escaping their due share of the burden, while the State is correspondingly a loser.

14.21 The problems of the reform of the land revenue system are fourfold—first, initial settlement operations have to be completed in areas (mostly ex-zamindari and ex-Princely areas) in which no systematic settlement operations were even conducted or where satisfactory records of ownership do not exist; second, the disparities in land revenue paid in different parts of the State must be reduced; third, all unassessed lands, agricultural and non-agricultural have to be brought under assessment; finally, it must be ensured that the overall yield of land taxation increases with the rise in agricultural incomes. This last is very important since a considerable part of rural consumption is non-monetized and hence cannot be affected by indirect taxes.

---

[1] As pointed out earlier some part of the increase is purely nominal resulting from a change in the mode of collection.

GSL

14.22 The Government has already initiated some measures designed to fulfil the objectives mentioned above. In some of the areas settlement work has already been taken up. As indicated earlier, such settlement operations are absolutely necessary as far as the unsettled areas are concerned. The question then arises as to what should be done to reduce disparities in land revenue in all the other areas which were settled at different times and on different principles. One possible method is standardization as recommended by the Taxation Enquiry Commission. In fact, a bill to bring about standardization, namely, the Orissa Standardization of Rent Bill, was drawn up for the consideration of the State Legislature. However, it is doubtful whether standardization is the solution best suited to conditions in Orissa.

14.23 Apart from the ex-Princely areas, the State has inherited three different land tenure systems—the Bengal System in the districts of Cuttack, Puri and Balasore; the old C.P. system in Sambalpur and the Madras system in Ganjam and Koraput. Hence land revenue payments were determined according to different principles in different areas. Now, the scheme put forward by the Taxation Enquiry Commission was designed mainly to correct disparities in the rates of land revenue that arose as a result of different lands having been settled on different dates. The prices in the relevant "reference periods" being different, disparities arose in the rates of revenue to be paid by landlords settled in earlier years and those settled in later years. Only these disparities will be reduced by the scheme put forward by the Taxation Enquiry Commission, but the disparities found in Orissa are probably due more to hetrogeneity of the principles of settlement adopted in different areas under different administrations.[1] It is, therefore, urged that the scheme of the Taxation Enquiry Commission is not the best suited to conditions in Orissa. The problem of increasing the yield of land revenue as well as that of reducing disparities in an equitable way may both be solved to some extent if resettlement operations are carried out in all areas that have not been resettled for long. The difficulty here is one of administration, cost and time. What is needed is a less elaborate and quicker method of resettlement than the traditional time-consuming process.

14.24 Since the abolition of the Zamindari, the Agricultural Income Tax has become insignificant from the revenue point of view. If a ceiling on land holdings is imposed, as now contemplated, around 33 acres, no purpose would be served by retaining the tax in its present form.[2] It may well be replaced by a surcharge on land revenue payable by those who own lands above five acres at rates made progressive with reference to land revenue paid. This surcharge should be introduced only after resettlement or standardization, as otherwise present disparities will only be accentuated. The surcharge is intended to impart an element of progression to the taxation of income from land. Holdings in the range of 5 to 30 acres account for roughly 12 million acres. If the surcharge is made progressive, a sizable yield can be expected.

14.25 As indicated above, the importance of increasing the yield of land taxation ultimately stems from the fact that a great part of the rural consumption is non-monetized and cannot at present be reached effectively through consumption taxes. With the rapid industrial development of the State envisaged in the Report, commercial taxes can be relied upon more and more

---

[1] It is learnt from the Revenue Department, for instance, that in the districts of Cuttack, Puri and Balasore, lands bear lump rentals, the rates having no relationship either with the classification of soils or with any other relevant factor. The same type of land situated in the same village but included in different holdings pays different rates of rent.

[2] Agricultural incomes could of course be made subject to Central income tax, but this is a matter requiring Centre–States agreement.

GSL

in the future. However, it would be prudent to rationalize the structure of commercial taxes even at this juncture so that as the secondary and tertiary sectors develop, a part of the rise in incomes may be automatically channelled into the exchequer.

14.26 The most important commercial tax is the general sales tax. The problem at the moment is to discover what system of sales taxation is best suited to conditions obtaining in Orissa. The Taxation Enquiry Commission recommended a low general multi-point levy together with a selective single-point levy. More recently, Dr. P. S. Lokanathan has recommended to the Madras Government that the single-point tax at source should be adopted in the case of commodities the producers and/or importers of which can be identified and checked easily. He says, "Control of the source is relatively simple in the case of organized industries. But in the case of imports and in the case of agricultural produce it is impossible to devise any method which can ensure that all imports and all sales of agricultural produce will be duly accounted to the commercial tax authorities."[1] Orissa has very few organized industries and imports a considerable proportion of the goods it consumes. A multi-point or at least a double-point levy therefore, may be more suitable for Orissa at the present stage of its development. If the rate is kept low (half or one per cent for the multi-point levy), there need be no fear about undue integration or the elimination of small middlemen. This happens only when the rate is kept high as in Germany (4 per cent). Further, if the exemption level is kept fairly high, say Rs. 10,000 or Rs. 15,000, the danger of the disappearance of small retailers may not arise at all.

14.27 At present in Orissa, a single-point sales tax is levied at the last stage of sale. One disadvantage of this tax, from the point of view of Orissa, is that whereas on the goods exported from Orissa only the inter-State sales tax of one per cent is paid by consumers living outside Orissa, on the goods imported into Orissa from the States having a multi-point system, tax is paid at more than one point and presumably all of it is shifted to consumers in Orissa. Ideally, perhaps, each State should have a single-point last-stage tax affecting mostly consumers within that State, apart from the inter-State sales tax. However, administrative realities as well as the fact that other States have a multi-point levy, favour the imposition of a multi-point system in Orissa. Though a larger number of dealers have to be dealt with under the multi-point system, it is easier to prevent total evasion of tax on any one commodity in the sense that it may be caught at one or other succeeding stages of sale. It is noteworthy that the proportion of revenue from the sales tax to total State tax revenue is generally higher in the States which have the multi-point system or the double-point system. For example, it is higher in Andhra Pradesh than in West Bengal. In the light of the above, it is urged that the State Government should give earnest consideration to the question of reforming the system of sales taxation.

14.28 Recently, a tax has been imposed on some goods carried by roads and inland waterways. This tax may be applied to passengers carried by buses. As bus passenger traffic is bound to increase in the coming years, the tax on passengers will prove to be an elastic source of revenue.

14.29 It is not intended that the additional burdens involved in the measures discussed above should be imposed all at once on the people of Orissa at the present admittedly low levels of income. It is as the incomes of people in both urban and rural areas rise that there is enough scope for additional taxation. Reform of land taxation may be taken up first not only because the burden of land revenues has decreased considerably in recent years but also because the great majority of the people live in rural areas. Other measures may be introduced in the course of the Third Plan period. A general principle that can be followed is that commodity tax rates may be raised only if there has taken place an increase in per capita consumption of basic commodities. It is obvious, however, that additional taxation is a matter in which there has to be Centre-State coordination.

---

[1] *Report on the Simplification and Improvement of the Sales Tax System in Madras*, Government of Madras, pp. 12-13.

14.30 Additional taxation can also be related to direct benefits that can be shown to have flowed from public investment. Betterment levy is an instance in point. There is considerable scope for this levy in Orissa because of the huge irrigation projects undertaken by the State. In fact, the Orissa Betterment Charges Act was passed in 1955 but no collections have yet been made. It seems that the Act in its present form has proved unworkable and substitute legislation is now under the consideration of the State Government. One important difficulty in the application of the Act arises from the fact that the basis of the levy is the net increment in capital value of the canals irrigated. According to the Act of 1955, the quantum of levy, to be recovered in 16 annual instalments, will be half the difference between the increase in capital value and the capital cost incurred to make the lands fit for irrigation. It is easy neither to determine the increase in capital value nor to estimate the cost involved in improving the land. Moreover, even though the levy is collected in instalments, the period usually being not larger than 15 or 20 years, payments based on unrealized increases in the capital value of land may impose undue hardships especially on the small owners. These difficulties can be avoided if the period of payment is made much longer and the levy is related to the cost of the undertaking, rather than to the presumed increase in capital value.[1] It is understood that in Mysore betterment contribution is being fixed on the basis of the cost of projects. The Bihar Irrigation and Flood Protection (Betterment Contribution) Act, 1959 has fixed certain *ad hoc* rates with reference to the nature and cost of the projects concerned. It is suggested that in Orissa legislation should be enacted on those lines and in such a manner that at least half the cost of the project can be recovered over a period of 25 or 30 years.

SMALL SAVINGS AND MARKET LOANS

14.31 As indicated earlier, increases in tax revenues are likely to be absorbed largely by increases in current development expenditure. For most types of capital expenditure, the State would necessarily have to depend on borrowing. The greatest importance, therefore, should be attached to the promotion and mobilization of small savings. Net collections of small savings have been of the following order in recent years:

NET COLLECTION OF SMALL SAVINGS IN ORISSA—1951-52 TO 1958-59

(Rs. lakhs)

1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59
6·09	48·25	71·66	76·22	107·04	114·13	123·22	152·30

There is a marked rising trend and with a much more intensified drive, collections can be made to rise faster. Greater collection of small saving would, of course, proportionately increase the amount the State receives as its share of total collections.

---

[1] It is obvious, of course, that the value of the land will be prevented from rising to the extent assumed by the very imposition of the levy. The bulk of the rise will take place only after the payments are over.

14.32 The total of market loans outstanding on 31 March 1958 was only Rs. 3·09 crores.[1] But borrowings from the Centre stood at Rs. 108·67 crores on the same date. Interest payments by the Government amounted to Rs. 3·75 crores[2] in 1957-58. This formed about 17 per cent of the total current revenues. Undoubtedly this is a high figure. Besides there are the mounting obligations of repayments of debts to the Centre. All of this is already causing a strain on the finances of the States. As it is, interest payments to the Centre are met not out of revenues but through further loans from the Centre. This device cannot be employed for long. The arrangements for financing the Hirakud project have been such as to lead the State Government to assume debt obligations clearly beyond its capacity to discharge. The question of further borrowing has to be considered in the light of the already large debt charges relatively to the total current revenues of the Government. Unless some arrangement with the Centre is made in regard to the debt incurred on account of Hirakud, and unless determined efforts are made to increase revenues, it would be unwise to embark upon large scale borrowing for further productive investment. Indeed this may not be possible since new loans will have to be used to pay off old loans.

NON-TAX REVENUES

14.33 The total yield of State taxes in Orissa amounted only to Rs. 7·66 crores in 1959-60. Even if the revenue from State taxes is increased by 50 per cent, the annual increase in absolute terms will be relatively small, namely, Rs. 4 crores. Compare this with the recommended target of about Rs. 50 crores of annual outlay during the Third Plan and the limited role that additional State taxation can play in developmental financing will be readily apparent. While the size of tax revenues depends upon both population and income, the size of developmental expenditure has to be determined more on the basis of population. It is, therefore, necessary for Orissa, to consider the feasibility of raising more of non-tax revenues.

14.34 Apart from the Central grants, the non-tax revenues of State Governments consist mainly of (*a*) administrative receipts, (*b*) income from public enterprises, and (*c*) income from property. Of these, administrative receipts are receipts incidental to the performance of governmental functions and as such cannot be looked upon as a source of revenue fit for exploitation. Similarly, item (*c*) income from the passive ownership of property is of no great consequence excepting for royalties from mines and quarries. But to earn the royalties, the Government itself is not called upon to make any investments. Therefore, they form an excellent source of non-tax revenue. In Orissa, there is considerable scope for the development of mineral resources and the Government will be able to augment considerably its income from royalties in the course of development.

14.35 Income from public enterprises is the most important source of non-tax revenue which, in the view of many, the State Governments should try to develop and exploit. As the burden of taxation cannot be made very heavy in a poor country like India, it is felt that every effort should be made to start and run public enterprises at a profit. There are, however, limitations to the use of this method. The merit of non-tax revenues is that it is in the nature of a price—a payment for services rendered. But if a public enterprise is used consciously as a means of raising revenue by the exercise of monopoly power, an element of tax inevitably enters into the price. It will no longer be then true to say that this way of raising revenue imposes no "burden" on the community. Secondly, the development of a source of non-tax revenue in the form of a public enterprise requires investment of capital, and often large amounts of capital. This involves borrowing and payment of interest. Only the difference between gross return and interest paid constitutes the true surplus income from public undertakings. All this is, however, not to argue against attempts to develop non-tax revenues. There is no bar at all to public enterprises earning a reasonable or "normal" rate of profits. And in suitable cases, a tax element may well be introduced if there is no over-riding consideration in favour of low pricing. It may be added that, from the point of view of raising revenue, enterprises with low investment/profit ratios should be favoured candidates.

---

[1] In 1958-59, the Government raised a loan of Rs. 3·29 crores.

[2] Excluding the share of Andhra.

14.36 As a matter of policy, all the State Governments in India have entered the field of certain public utilities like transport and electricity. Apart from these, the industries to be chosen by a State Government would depend upon the stage of development of the State, its resource endowment and the assurance of a steady demand both inside and outside the State. In the Indian economy, the position of Orissa somewhat corresponds to that of an agricultural country in relation to an industrial country. By and large, Orissa "exports" her agricultural produce and minerals and gets in exchange manufactured and other consumer goods. Thus the surplus that can form the basis of capital formation in Orissa—apart from unilateral flow of capital from outside—consists of the revenue from the sale of the products of agriculture and extractive industries. This surplus must be carefully garnered and preserved and utilized for capital formation. It would, therefore, be proper for the State Government to take such steps as would ensure for itself a part at least of the surplus arising from the sale of agricultural and mineral products.

14.37 The Orissa Mining Corporation is an extremely valuable instrument for this purpose. The Corporation is already exploiting certain iron ore mines and has recently been granted prospecting licenses over one area for chromite and two areas for manganese. If more areas are leased out to the Corporation not only for iron ores but also for chromite and manganese, it can profitably step up its operations.

14.38 Forests are another important source of revenue for the Government. Revenue from this source has increased from Rs. 73 lakhs in 1949-50 to Rs. 3·13 crores in 1959-60. And yet revenue per acre is only Rs. 1·90, which is perhaps the lowest in India. The steps needed to develop the forest wealth of Orissa are discussed in detail in the chapter on forests. Such development will begin to yield fruits only after a period of gestation. To get revenues in the short run, attention should be concentrated on improving the methods of disposal of the forest products presently available and on a fuller exploitation of minor forest produce. It is understood that a considerable part of the forest produce is supplied free or at nominal rates. This seems to be especially true of bamboos. The rates for various forest products were fixed 20 or 30 years ago and stand in need of revision. In view of the great rise in all other prices that has taken place in the last two decades, such a revision would be quite justified. The Forest Department is of the opinion that the value of the timber in forests will be much enhanced if communications in forest areas are improved by laying new roads as well as new railway lines.

14.39 Revenue from minor forest produce has been declining because of large scale smuggling. The contractors are said to be hesitant to make investments when they cannot be sure of fully reaping the benefits themselves. Considerable revenue from the sale of minor produce can be expected in the short run if administrative arrangements can be worked out to put an end to large scale smuggling.

14.40 An important product which Orissa is able to export is rice, the exportable surplus being estimated at 0·3 million tons in 1960-61. By 1971, the surplus would probably have risen to 2 million tons. Consistent with all-India policies and the requirements of needy States, some arrangements can be worked out by which some reasonable quantum of profits on the export of rice and paddy may be channelled into the exchequer of the State Government. If State Trading in foodgrains is not favoured for policy reasons, exports can be regulated through a system of licensed dealers and a suitable license fee may be charged. Incidentally, intervention by the State Government may ensure a fair price to the producers in the State, only a part of the middlemen's profits being absorbed by the Government.

14.41 The State Government is operating two important public utilities: Road Transport and Electricity undertakings. Operating accounts for the Hirakud project have just been opened (1960-61) and it may take some time before the power utilization scheme becomes self-financing. At present, the interest on capital borrowed is far in excess of revenue. The departmentally run Road Transport Undertaking is now able to bring in a net revenue of the order of Rs. 42·7 lakhs. In addition, about Rs. 15 lakhs are set aside as depreciation. It would therefore seem that the Transport Undertaking would be able to finance its expansion programme.

A TENTATIVE ESTIMATE OF RESOURCES AVAILABLE

14.42 The Report envisages a total programme of investment in the State of the order of Rs. 1,420 crores in 1961–71. This obviously would consist of private investment, direct investment by the Central Government (including railways) and investment by the State Government. It is estimated that of the total of Rs. 1,420 crores, roughly Rs. 576 crores of investment will fall within the State sector. In other words, the State Government will have to raise on its own, or otherwise obtain, resources of this magnitude in the 10-year period 1961–71.

14.43 In what follows, an attempt is made to estimate the quantum of resources that the State Government is likely to be able to make available for investment in this period. Projections of revenue over such a long period as ten years, with all the attendant assumptions, are necessarily tentative in the sense that realization of expectations hinges upon the fulfilment of a number of conditions such as: development on the scale envisaged does in fact take place, the State Government would be anxious to see its tax revenue increase, the tax machinery would be suitably strengthened and so on. The intention here is merely to indicate the general magnitude of effort that the State will have to put forth, if it is desired to implement the programme within the 10-year period.

14.44 It must be pointed out that the estimates of tax revenue given above take into account only the effects of increase in State income; no credit is taken for the yield from additional tax measures.[1] Similarly the targets for small savings and market loans are based on what might

---

[1] The one exception is land revenue where effects of resettlement operations are included.

A Tentative Estimate of Resources (1961–71)

(Rs. crores)

1. Tax Revenue	223·990
2. Administrative Receipts	64·480
3. Profits of Electricity Undertakings	20·136
4. Revenue from Forests	27·915
5. Profits of Rajya Transport	4·810
6. Profits from Mining	6·050
7. Revenue from Royalties	19·155
8. Total Revenues	370·536
9. Recurring Expenditure under Development heads including committed Expenditure on Second Plan Schemes	164·53
10. Non-development Expenditure	135·74
11. Total Non-Plan Expenditure	300·33
12. Surplus on Current Account available for Plan Outlay (8–11)	70·20
13. Market Loans	52·50
14. Share of Small Savings	21·25
15. Repayment of Debts to the Government	13·20
16. Total Resources on Capital Account	86·95
17. Total State Resources (12+16)	157·15

Note: Details of projections of receipts and expenditure are given in Appendix 11.

be achieved at present levels of effort. On this basis, the amount that the State Government could make available for Plan investment in 1961–71 works out at Rs. 157·2 crores, as against the requirement of Rs. 576 crores. If the programme is to be implemented in its entirety within the 10-year period, additional tax effort and borrowings by the State Government as well as a large measure of Central assistance would be called for.

14.45 It was pointed out earlier that the tax effort by the State, as indicated by the ratio of State taxes to State income, was low as compared to a number of other States. Over the Second Plan period, the ratio of State taxes to State income has risen from 1·6 per cent to about 2·6 per cent. Even this is lower than the corresponding ratios for most other States mentioned in Table 1 at the beginning of the Second Plan. It is, therefore, clear that the State would have to strive to raise substantial resources through additional taxation. The target for additional taxation during the Third Plan period has been fixed at Rs. 23 crores. If an equal amount were to be raised during the Fourth Plan period, additional taxation in 1961–71 would amount to Rs. 46 crores. Including this, the total resources which the State could contribute towards Plan investment would amount to Rs. 203·2 crores.

14.46 The above estimate of the likely magnitude of State contribution, measured against requirement of Rs. 576 crores, reveals a gap of Rs. 372·8 crores. This reflects the basic dilemma of development of backward regions such as Orissa. The needs as well as potentialities of development of Orissa demand, in the judgement of the National Council, investment of a large order as recommended in the Report. But the State would probably be able to raise only less than half of the resources needed for the programme of investment. A large measure of Central assistance, therefore, would seem to be called for;[1] whether Central assistance on the scale indicated above should be allocated to Orissa or whether, in the alternative, the programme should be pruned, it is beyond the scope of this Report to consider. However, it may be noted that the proposals for financing the State's Third Plan envisage Central assistance to the extent of more than 80 per cent of the total outlay.

---

[1] Only investment requirements have been taken into account in the above calculations. The magnitude of Central assistance would be higher than the gap of Rs. 328 crores, if current outlay under the Plans is taken into account.

Chapter 15

Pattern of Growth

Nature of the Problem

DESPITE THE LARGE potential of natural resources, the economy of Orissa does not secure a high per capita income and reasonable standard of living for the inhabitants of the State. In 1956-57 the per capita income in Orissa was only Rs. 190 as compared to Rs. 294 in all-India. The level of consumption expenditure was low[1] and standards of public health and general education inferior as compared to other States.

15.2 The basic reason for the poverty is that the exploitation of the rich resource potential is still in an early stage. Till recently the mineral wealth of Orissa was practically untouched, and even the ore that was mined was not utilized in industries located within the State but was exported to other parts of the country. Backward technique of production is another characteristic of early stage of economic development. This is reflected in lower output per worker in every sector in comparison with the average for all-India. In agriculture the net output per worker in Orissa was about 83 per cent, in factory industry roughly 70 per cent and in non-factory industry 70 per cent of the all-India averages.

15.3 For raising per capita income in Orissa, therefore, a two pronged attack on under-utilization of resources and low per worker productivity is necessary. The development programmes suggested in this report have this as the principal aim.

Size of Investment Programme

15.4 A total investment of Rs. 1,427 crores is suggested for the period 1961–71.[2] This implies a big rise in the rate of investment, since total investment in 1951–61 was Rs. 434·8 crores.[3] In view of the fact that the probable investment in India during the Third and Fourth Plans is likely to be in the neighbourhood of Rs. 30,000 crores and that if this were allocated among the States on population basis, Orissa would get Rs. 1,200 crores, the programme suggested in this report appears to be weighted in favour of Orissa to the extent of 18 per cent. However, a larger volume of investment for Orissa than is suggested by mere population considerations is justified both by the vast and inadequately exploited resources and the relative economic backwardness of the State.

15.5 The present industrial policy of the Central Government gives high priority to the

---

[1] Rural monthly per capita expenditure:

Orissa	Rs. 15
All-India	Rs. 21

Source: National Sample Survey, 4th round.

[2] All estimates in this Chapter are at 1956-57 prices. See Appendix 12 and Table 84.

[3] See Appendix 3 and Table 9 for the estimates of investment.

CSL

establishment of heavy metallurgical industries. These industries are regarded as a necessary precondition for the development of a modern industrial structure in the country. Being resource-oriented, these industries are generally located near the ore deposits and, as Orissa is rich in the requisite minerals, a rapid growth of large scale metallurgical industries is bound to occur in the State. Investment in these 'spearhead' industries is intimately related as much to the growth of the national economy as to that of the State. The first step in this direction has already been taken with the establishment of the Rourkela Steel Plant.

15.6 The backwardness of Orissa's economy is particularly evident in its agriculture. Primitive techniques of production and subsistence farming resulting in lower productivity are characteristic of this sector. For this reason and also because agriculture is the largest sector in the economy, supporting about 70 per cent of the population, no significant increase in State income can occur without a rise in agricultural productivity, at least to a level comparable with that anticipated for all-India. Moreover, considering the large potential, the increase in agricultural output would enable Orissa not only to feed its growing population but also to contribute to the solution of the national food problem.

15.7 An important factor hindering the development of agriculture is the existence of numerous pockets in the rural areas where, due to inadequate transport and marketing facilities, local surpluses or "gluts" show up in the harvest season depressing prices and removing incentives for cultivators for improving techniques and increasing production.

15.8 Development of transport is necessary not only for the progress of agriculture, but also for the growth of industry, especially the manufacture of iron and steel. The transport requirements of this industry are principally met by railways, which have to be built to collect the raw materials and distribute the finished product. Availability of power at reasonable rates is equally essential for industrial development. The demand for power depends on the rate of industrial development and its character as regards power intensity. On both these counts the power requirements in Orissa would be high.

15.9 It is evident that the present backwardness of Orissa's economy and the nature of its resources favour a relatively large investment in agriculture on the one hand, and a more capital intensive industrial development on the other. This justifies a larger allocation of the all-India investment in favour of the State than could be expected on merely population basis.

15.10 The suggested allocation of investment between the different sectors of the economy during 1961–71 is indicated in Table 84. A large part of the investment (39%) is proposed for the development of factory industry. Agriculture and allied activities are next in importance receiving 21·7 per cent of the total investment.

15.11 In each sector, the volume of investment proposed for 1961–71 is greater than it was during 1951–61. The largest increases are proposed in the case of power and tertiary activities like transport, housing and public health. The percentage allocations are higher also for primary activities like agriculture and mining. The proportion of total investment allotted to factory industry, however, is less, though it still accounts for nearly 40 per cent of the total investment (Table 85). The emphasis on the development of the infra-structure is meant to bridge the wide gap between the existing facilities, which are inadequate, and the relatively large future requirements associated with the rapid rate of growth anticipated.

15.12 Of the total investment proposed, Rs. 1097·1 crores (i.e., over three-fourths or 76·9%) would be in the public sector. About 52·5 per cent of the public sector investment

GSL

or over 40 per cent of the total investment would be by the State Government, chiefly in agriculture, power and transport development. The bulk (86%) of the proposed Central Government investment of Rs. 521·2 crores in Orissa would be in the iron and steel industry, the remainder being in transport and mining. Factory industry (both large and small) would absorb about 31 per cent of the total private investment of Rs. 329·9 crores in the decade. The major part of the remaining private investment would be in tertiary activities, chiefly, housing, and in agriculture.

15.13 The objective of this investment programme is to intensify the exploitation of natural resources and to increase labour productivity in each sector of the economy. To this end, the expansion of the already existing industrial sector, especially mineral-based industries, is stressed. To facilitate this development greater emphasis is laid than was done during the past decade on the development of economic and social overheads like power, transport, public health and education. At the same time emphasis is laid on acceleration of the increase in agricultural output, because with over 70 per cent of the State's working force engaged in agriculture, industrial growth by itself cannot produce a significant rise in per capita income. In short, in the programme for 1961–71 as suggested by NCAER, the utilization of the hitherto unexploited resources and the raising of the productivity in the industrial sector to a very high level through the establishment of technologically advanced resource-based industries, is proposed. At the same time productivity in agriculture which employs the bulk of the working force is to be raised significantly. To facilitate these developments, strengthening of the infra-structure is necessary.

Main Directions of Growth

15.14 The programme for development, if fully implemented, would raise the State income from Rs. 372·6 crores in 1960-61 to Rs. 896·1 crores[1] in 1970-71 or at an average annual rate of 14 per cent (Table 86). Per capita income during the period would increase from Rs. 212 to Rs. 420 or at 9·8 per cent a year. These rates of growth are much higher than those expected to be achieved by the country as a whole during the Third and Fourth Plans, and would bring the State per capita income nearer the all-India average.

15.15 Roughly 37 per cent of the total increment in the net product during the decade would be generated by mining and factory industry, nearly 24 per cent by agriculture and allied activities, and about 30 per cent by the tertiary sector. The remaining 9 per cent of the increase in output is accounted for by secondary activities like non-factory industry, power and construction.

Industrial Growth

15.16 The programme for industrial growth would change the existing structure of factory industry. In 1960-61 roughly 37 per cent of the total factory employment was expected to be in agriculture-based industries, 31 per cent in mineral-based, 14 per cent in forest-based and 12 per cent in metal-based industries. These proportions would change significantly by the end of the next decade, since, of the additional employment in factory industries during this period, 42 per cent would be in mineral-based industries, 27 per cent in metal-based, 17 per cent in chemical and less than 2 per cent in forest-based industries.

---

[1] *See* Appendix 13.

15.17 The net output of factory industry would increase eight-fold during 1961–71. Of the additional net output, about 75 per cent would be generated in mineral-based industries (almost wholly in steel industry), 11 per cent in metal-based industries and 9 per cent in chemical industries, the remaining 5 per cent coming from all other factory industries.

15.18 The change in the composition of the factory sector would be of fundamental importance for a rapid economic growth in Orissa. Firstly, it implies the predominance of those industries in which not only net output per worker is the highest, but which are also technologically among the most advanced. Consequently, their impact on the area in which they develop is more decisive. Secondly, the iron and steel industry gives a big impetus to further industrial development. The increased demand for iron and steel from a large number of engineering industries, the demand for products of industries ancillary or subsidiary to iron and steel industry, the availability of by-products utilized for other manufacture, and the increased income generated within the region, all provide a stimulus for the growth of other factory industries. This makes the iron and steel industry the spearhead of growth of the State's economy.

15.19 However, the impetus to industrial growth provided by it will not become effective unless a planned effort towards this end is made. Unlike metallurgical industries manufacture of metal products is market-oriented for whose development the availability of skilled labour is an important location factor. The large investment suggested for construction, transport, sanitation and drainage facilities, and for agriculture is likely to lead to an increased demand for tools and implements, pipes and other items. At the same time, with the establishment of the steel plants, a nearby source of raw material and a nucleus of skilled labour would be created. Together with the encouragement received from the Government these conditions would lead to the growth of engineering industries aimed at meeting initially the local demand and subsequently, national as well as export demand.

15.20 Roughly a quarter of the total industrial investment and about 40 per cent of the net output, employment and power requirements would materialize during the Third Plan (Table 34). The investment-output and the investment-labour ratios during 1961–66 would thus be lower than those in 1966–71. This is largely on account of the expansion of Rourkela Steel Plant and the resulting increase in output and employment during the Third Plan. The higher capital-output ratio during 1966–71 would be the result of the new investment in the second steel plant at Bonaigarh, the full output of which would materialize only after 1971.

15.21 About three-fourths of the total investment in large scale industry would be in the public sector, the proportion being 58 per cent in the Third Plan and 92 per cent in the Fourth. All this investment would be in the iron and steel industry. The rise in the proportion of total industrial investment in the public sector does not indicate a trend that will persist in Orissa in the future. It is a result of the expansion of a steel plant and the anticipated establishment of another. In succeeding Plan periods, these plants would stimulate industrial growth most of which would in all probability be in the private sector. When this growth materializes the predominance of public investment in the industrial sector would decline.

15.22 The bulk of the industrial growth would occur in the triangular area with Cuttack at the apex and Rourkela–Hirakud as the base. Both the existing and the suggested steel plants would be on the proposed rail-link between Rourkela and Cuttack, and subsidiary and ancillary industries are likely to develop along the railway line. Paper, aluminium, engineering and cera-

GSL

mics industries would grow in the Hirakud–Brajrajnagar area, and engineering, ceramics and glass industries around Cuttack.

15.23 The northern districts of Mayurbhanj and Balasore and the southern districts of Koraput and Ganjam would thus be outside the pale of industrial development. From the point of view of regional balance, some industrial development is necessary in these districts. The chief resources of the area are the forests of the Eastern Ghats, minerals such as manganese and clays, and agricultural produce, such as sugarcane. Industries based on these resources would mainly produce consumer goods. Their development would be closely related to the progress of agriculture and animal husbandry and the resultant rise in agricultural per capita income in the region. Strengthening of the agricultural base of this area is, therefore, particularly important.

15.24 A large expansion of small scale and cottage industries is also envisaged in Orissa. On account of the rapid growth of income and the increase in population that is likely to occur, the demand for consumer goods would increase rapidly and despite competition from factory industry and the consumer preference for factory-produced articles it is estimated that the demand for the output of non-factory industry would grow, although at a somewhat slower rate than the total demand. A rapid growth of small scale factory industry producing both ancillary products and consumer goods is also to be expected in Orissa. This is particularly so because in size, technology and productivity small scale factories represent a big step forward from the cottage industry and more akin to modern large scale enterprise. As such their growth and development bear a positive correlation with large scale industrial expansion envisaged for Orissa during the present decade. A total investment of Rs. 11·7 crores in cottage industry and Rs. 22·5 crores in small scale factories is estimated to materialize in Orissa during 1961–71. The net output of cottage industries is expected to increase by Rs. 14·72 crores and of small scale factories by Rs. 11·25 crores during the same period.

Mining

15.25 Growth of mining activity in the State is geared both to the development of mineral-based heavy industry and to the expansion of iron ore exports. A growth rate of about 37 per cent per year is implied in the programme for mining. The very fast rate of increase would raise the share of mining in the State's net product from 2·3 per cent at the beginning of the Third Plan to 4·7 per cent at the end of the Fourth Plan. The main deposits are located in the four inland districts of Mayurbhanj, Keonjhar, Sundargarh and Sambalpur where the major development of mining would occur.

Power Development

15.26 The provision of power is essential for industrial development. Orissa has a very large hydro and thermal power potential. The hydro power potential is estimated at 2,875 MW, and is supplemented by a deposit of 800 million tons of coal suitable for power generation. In spite of this, per capita electricity consumption in Orissa is the lowest in India. These facts along with the large power requirements resulting from the programme of industrial growth explain the allocation of Rs. 184 crores or 13 per cent of the total investment, for power development. The estimated total power requirement of the State in 1971 is 860 MW. As against this, an in-

GSL

stalled capacity of about 1,000 MW has been suggested so as to meet the effective power demand during the decade and also to serve as a reserve capacity for uninterrupted industrial development towards the end of the period and for a few years thereafter.

Development of Transport

15.27 Orissa has a deficient and ill-distributed transportation system. This hampers all-round economic development and hinders the exploitation of resources. Without a large expansion of existing facilities, the transport requirements cannot be met. Under these circumstances an investment of Rs. 105·8 crores in transport and communications, though apparently modest, would still be adequate for industrial as well as agricultural development. About 3,097 miles of roads would be built, and railway links between Sambalpur and Titlagarh, Domaro and Talcher, and Cuttack and Paradip port constructed.

Growth in Primary Sector

15.28 Under ideal conditions an investment of Rs. 270·5 crores in agriculture could raise the net value of agricultural production by about 90 per cent during 1961–71. This, however, is only a technical feasibility of production, and the more realistic estimate would be that the net output of agriculture would increase by about 6·5 per cent annually. This implies a higher capital-output ratio in agriculture than would prevail if the organizational and other shortcomings did not exist.

15.29 The major methods proposed for increasing production are better techniques and irrigation. Irrigation absorbs about 60 per cent of the total investment and is directly responsible for about 14 per cent of the increase in agricultural production suggested. The emphasis on irrigation is not only on account of the large irrigation potential of the State, but also because it enables an increase in cropping intensity through extension of double cropping and permits the extensive use of fertilizers. Thus a large part of the increase in agricultural production is the result either directly of extension of irrigation or indirectly of measures made possible by it. However, it raises the capital requirements of the programme for agriculture.

Animal Husbandry

15.30 An investment of Rs. 8 crores is proposed for animal husbandry development programme during 1961–71. Nearly three-quarters of this would be for artificial insemination centres and veterinary clinics with the object of improving the quality of the cattle in the State. A programme for the development of poultry farms is also proposed. However, the bulk of the investment is on programmes which have a long gestation period, being mainly directed towards improving the quality and efficiency of the stock. Hence, only a modest growth of 2·7 per cent per annum is expected in this sector during the next 10 years. The direct employment potential of the programme is also very limited.

Forest Development

15.31 An investment of Rs. 16 crores is proposed for the development of the State's forests. About 25 per cent of the investment would be used for afforestation and the remainder for development and fuller exploitation of the existing forest wealth. With the investment pattern envisaged, forest output is expected to grow at an annual average rate of 9·4 per cent during 1961–71 and employment for some 1,500 technical personnel and seasonal employment for over 500,000 of unskilled workers would also be created.

Growth in Tertiary Sector

15.32 Nearly a quarter of the investment during 1961–71 is allocated to the tertiary sector including transport and public health and it is expected to generate nearly one-third of the increment in net output during the period. The stimulus for the expansion of tertiary activities can be traced to three different sources. First, there is expansion of activities directly linked to the requirements of the growing industrial and agricultural sectors, e.g., training of skilled labour and development of transport and trade and commerce. Second, accepted social norms lead to expansion of facilities like education and public health. Finally, with growth of industrial and agricultural production and rise in per capita income there is expansion of demand for all kinds of services. It is estimated that the sector as a whole will grow at about 14 per cent per year during the decade.

15.33 The relatively high death rate and poor health standard prevailing in Orissa cause a high burden of dependency, depress the productivity of the working force, and hamper economic development. An expenditure of Rs. 49.7 crores has been suggested for a public health programme which would reduce the economic burden of the high incidence of mortality and disease, and would provide protected water supply and modern drainage facilities to important urban centres.

Conditions for Development: Manpower

15.34 Manpower must be available if the programme for development is to be fulfilled. The demand for manpower in each sector of the economy is a function of its rate of growth and the productivity of labour in it. However, employment in agriculture is residual, the sector absorbing surplus manpower in the economy and releasing it as required. Labour productivity in agriculture, under the prevailing social and economic organization, is, therefore, not simply an independent variable affecting manpower requirements but to some extent a dependent variable reflecting the supply of labour. Consequently, the employment generated during 1961–71 in the non-agricultural sector has been estimated on the basis of the rate and character of expansion envisaged in the programme for development in that sector. The incremental employment in agriculture is derived as residual by subtracting manpower requirement of non-agricultural sector, from the additions to labour force. (Table 89)

15.35 It appears that the additional manpower requirements in the non-agricultural sector during 1961–71 would be about 1·40 million, of which the largest increase would be in the tertiary sector followed by construction and mining. The new entrants to the labour force during the period would be 1 million, just sufficient to meet the demand in the non-agricultural sector. An equality of labour supply and requirements would result for the economy as a whole only if the demand for labour in agriculture were unchanged. However, this is not possible since with 6·5 per cent annual increase in agricultural output proposed for 1961–71, mostly through better techniques and increased intensity of cultivation, labour requirements would increase in agri-

GSL

culture substantially, leading to an overall shortage of manpower in Orissa. This may hinder the implementation of the measures to increase agricultural production especially if there is an exodus of workers from land to other occupations as employment opportunities are created by growth of mining, industry and tertiary activities. It, therefore, appears that the suggested programme of development would require an additional supply of labour. The shortage of manpower in industry and other non-agricultural sectors could be met to some extent by migrant labour from other States. If, on the other hand, migrant labour in industry and mining is not available, it is all the more necessary to reorganize the techniques of cultivation with a view to making more efficient use of the smaller labour force available for agricultural work.

15.36 This would reduce the manpower requirements of agriculture and would also raise the net output per worker thereby facilitating the attainment of a higher standard of living. It would reduce the chances of creation of a "dual" society, composed of a non-agricultural sector with a high level of technology and labour productivity and an agricultural sector with backward techniques and a very low net output per worker.

15.37 For the improvement of cultivation, a thorough study of rice cultivation should be made to determine the operations for which simple mechanical appliances would be used, and an attempt should be made to propagate the adoption of labour-saving devices in agriculture.

15.38 Considering the pattern of growth proposed for the State, it is evident that skilled labour would be required in considerable numbers. It is estimated that the annual requirements for engineers during 1961–71 would be 70 per cent higher than the annual outturn of training institutes in the State at present. For craftsmen the annual requirements are estimated to be three times the annual supply. A big programme for expanding technical training facilities is, therefore, necessary. However, an expansion of training facilities cannot meet the shortage of trained personnel immediately because the lag between the establishment of training institutions and the outturn of trained personnel is fairly large—from 2 to 5 years. In the initial period, therefore, the shortage of technical personnel within the State implies the use of skilled people from other States if the programme of development is not to suffer.

15.39 Apart from sufficiency of manpower, other conditions must be met if the programme for development is to be successfully implemented. To encourage the "snow-ball" development of industries around the nucleus provided by steel, government planning and aid are necessary. It is suggested that a Development Wing be established in the Department of Industries to advise entrepreneurs and an Industrial Development Trust should be set up to attract capital required for industrial development.

15.40 For the achievement of the target for agricultural production a great strengthening of the agricultural extension service is necessary. Better cultural practices, fertilizers, improved seeds and irrigation will be adopted by the cultivators if intensive efforts to overcome their inertia are made. This would require a larger number of trained workers in specific fields. Special emphasis must be placed on improving the techniques of rice cultivation as the crop accounts for three-fourths of the net output of agriculture.

Impact on the Economy

15.41 If all the development programmes suggested in this report are successfully implemented, the State income would increase from Rs. 372·6 crores to Rs. 896·1 crores during 1961–71, or at an average annual rate of 14 per cent. At the same time per capita income would be almost doubled from Rs. 212 to Rs. 420.

Sectoral Growth

15.42 This rate of growth of income is much faster than that anticipated for India as a whole during the Third and Fourth Plans. It is largely on account of the rich mineral resources of the State which, as indicated earlier, are bound to be exploited as a part of national policy, and are expected to support a rapid expansion of industry. Agricultural output would grow at about 6·5 per cent and that of factory industry at over 71 per cent per annum and the total output of all sectors increase at a rate of 14 per cent per year. Output of tertiary activities during 1961–71 is assumed to grow at the same rate as the output of primary and secondary sectors (Table 86). As a result of the envisaged development during the period the net output originating in agriculture would fall from 50·5 per cent of total State income to 30·3 per cent, and that in industry would rise from 5·9 per cent to 20 per cent (Table 89). Consequently, Orissa would be transformed from a relatively backward agricultural economy into an advanced industrial State.

Productivity

15.43 The change in the economic structure would be accompanied by an increase in overall labour productivity. A part of this would be due to shift of the working force from a low productivity sector like agriculture to a high productivity sector like industry. In addition, however, there would be marked increase of productivity within the various sectors of the economy (Table 88). The major increase in productivity (about 250%) is expected to occur in the factory industry of Orissa where the output per worker is already very high. This is largely due to the character of industrial development envisaged for Orissa. Metallurgical industries that would dominate the industrial scene in the State are technologically among the most advanced and capital intensive and have a very high labour productivity. Output per worker in the other sectors of the economy is expected to increase by roughly 50 per cent during 1961–71.

Occupational Structure

15.44 The change in the economic structure of Orissa, when considered in terms of employment, would, however, be more modest though large when compared to the change anticipated to occur in all-India during the same period. The proportion of the total working force in agriculture and allied activities would decline from 73·1 per cent to 62·8 per cent during 1961–71, while that in factory industry would rise from 1·2 per cent to 2·1 per cent. The tertiary and mining sectors which are estimated to employ 15·2 per cent and 1·2 per cent of the working force respectively in 1961, would employ 20·6 per cent and 3·4 per cent in 1971 (Table 89). Broadly, the share of the working force in sectors with relatively low labour productivity like agriculture is likely to decline while in other sectors, it would increase.

Importance of Agriculture

15.45 It appears that roughly three-fifths of the population of Orissa would still be dependent

GL

on agriculture in 1971. The importance of implementing the programme of agricultural development in an attempt to raise the standard of living of the masses is, therefore, obvious. Industrial development in Orissa is already on its way, with the net output of factory industry expected to increase by 357 per cent between 1956-57 and 1960-61. There is little doubt that this growth will be maintained during the next ten years. By contrast, the progress of agriculture in Orissa has been slow. It has to be stepped up considerably if sectoral disparities are to be reduced. Particular emphasis should, therefore, be laid on the fulfilment of the targets for agricultural development.

GSL

Chapter 16

Summary of Conclusions and Recommendations

1. THE SETTING

ORISSA IS ONE of the more backward States in India. Its per capita income was Rs. 190 in 1956-57 as compared with Rs. 294 in all-India.

2. Structurally, its economy is dependent on agriculture to a greater extent than the economy of the country as a whole and the manufacturing industry is relatively less important.

3. Agricultural productivity both in relation to land and working force is very low in Orissa, because of relatively low crop yields and poor harvest price of rice—a crop which covers over 62 per cent of the State's cultivated area. Backward techniques are mainly responsible for poor yields, and lack of transport and organized marketing facilities for the low price of rice.

4. Industry in Orissa is dominated to a greater extent by cottage and village type of manufacturing activity than in all-India. Agriculture-based industry contributes the major part of total industrial output. Average net output per worker is low both in factory and non-factory industry as compared with the average for all-India.

5. Mining activity is meagre viewed against the large mineral resources of the State.

6. Seventy per cent of the working force is engaged in agriculture. The efficiency of the working force as a whole is adversely affected by their poor health and lack of training.

7. Orissa is rich in its natural resources. Its forests cover 42 per cent of the State's area (as against 17 per cent in all-India) and are a large potential source of industrial raw material. Its mineral deposits, chiefly iron ore, coal, manganese, limestone, fire clay and chromite are among the best in the country. The rivers of the State provide much scope for considerable development of irrigation and hydel power. There are several fertile regions in the State which can give high yields of crops, specially rice.

8. During the Second Plan period a big step forward has been taken to exploit the mineral resources of the State for industrial development and for expansion of export trade. The establishment of the Rourkela steel plant and the development of other mineral-based industries (refractories, ferro-manganese and cement) have resulted in a large expansion of the State's industrial output. An even more important aspect of this development is that firm foundation has now been laid for industrialization of the State.

9. In the meantime, however, agricultural development has progressed rather slowly. This is significant for the future development of the economy, because unless the agricultural sector grows at a rapid rate the State will face the danger of having a dual economy—one sector having a very low productivity and the other having a very high productivity. Thus, while the development of industry should follow the lines on which considerable progress has already been achieved, great effort should be made to put agriculture on a sound footing.

10. In order to bring about the desired growth in both these sectors, improvement of the

CSL

infra-structure of the economy, chiefly transport, power and public health must receive a high priority.

2. AGRICULTURE

11. Agriculture (excluding allied activities) contributed more (48 per cent) to total net output in Orissa than it did to the total net product in all-India (43 per cent). A large proportion—about 70 per cent—of the working force of the State was employed in agriculture.

12. Agricultural productivity per acre of land as well as per engaged worker was lower in Orissa than in all-India, which is to be attributed to relatively low yields and low harvest price of rice.

13. With the exception of sugarcane, pulses and rice, the yield per acre of all other crops is lower in Orissa than in all-India. In the case of rice, which covers over 62 per cent of the total cultivated area of the State, the yield compares favourably with the all-India average but is still below the average yield in other rice growing States like Madras, Andhra Pradesh, Kerala and West Bengal.

14. On account of the overwhelming importance of rice in the cropping pattern of the State, the price of rice plays an important part in determining the value of agricultural output. The average harvest price of rice in Orissa was about 30 to 40 per cent lower than in Madras and Andhra Pradesh and about 15 to 30 per cent lower than in Bihar and West Bengal.

15. Considering the topography, soils and climate, the delta area of the coastal plains, river basins of the central table-land, the upland plain in Mayurbhanj district and parts of Koraput are capable of considerable agricultural development. It is therefore suggested that the development effort in agriculture should be concentrated in these regions.

16. On the basis of the existing potential for irrigation in the State it is suggested that an additional 3·5 million acres should be brought under irrigation during the ten-year period, 1961–71.

17. With additional irrigation, double cropping should be extended to 40 per cent of the net sown area and area under green manure to 5 million acres. Fertilizer input should be increased to 700,000 tons of ammonium sulphate and 100,000 tons of super-phosphate. Improved seeds should be provided for the entire area under major crops, whether through organization of seed farms in each NES block or through mutual exchange of improved seeds among cultivators.

18. In addition, cultural practices should be improved by introducing Japanese method of rice cultivation, line sowing of jute, deep ploughing where possible and use of better tools and proper cropping pattern.

19. To check soil erosion, shifting cultivation should be discouraged by settling tribal people on permanent farms and a programme of afforestation, contour bunding and terracing should be undertaken.

20. If all the development possibilities suggested in this report are fully realized, the production of foodgrains should increase in 1970-71 by 4·3 million tons, and the net value of total agricultural production should go up by Rs. 178·4 crores, an increase of 108 per cent over 1960-61 level.

21. Considering the development potential and the past trends of agricultural production in Orissa, it would be reasonable to expect agricultural output to increase at a rate of 6·5 per cent per year.

22. All this would require an immense organizational effort which can be made only through

the extension service. It is, therefore, suggested that the number of blocks should be increased to cover the entire agricultural area of the State, the number of village level workers and experts per NES block strengthened, and their quality and training improved.

23. With this increase of agricultural production, a surplus of 1·8 million tons of cereals would be available in 1970-71 for export to other States.

24. The investment required for the programme suggested is estimated at Rs. 212·3 crores in the public sector.

3. ANIMAL HUSBANDRY

25. Animal husbandry accounted for a lower proportion of the income generated on farms in Orissa than in all-India. The low output of animal husbandry was not due to low density of livestock per cultivated area but to its poor quality, attributable to the prevalence of poor indigenous breeds and lack of proper feeding.

26. To upgrade the cattle population, new breeds, preferably the Hariana, should be introduced. Since there is a great demand for Hariana bulls all over the country an adequate number may not be available. Artificial insemination should therefore be resorted to, and the establishment of an additional 154 main insemination centres is suggested for this purpose. The indigenous Parlakhemidi breed and the North Indian Murrah breed should be used to upgrade the buffalo stock.

27. The implementation of the programme for agricultural development suggested in this report would increase the supply of paddy straw, pulse wastes and oilcakes for cattle. The output of fodder crops should also be increased.

28. The poor veterinary facilities of the State should be improved by opening 250 additional dispensaries. The technical personnel required should be trained by using the veterinary college in the State at full capacity.

29. The development of dairying is an important part of any programme for livestock development. Milk unions should be established, and four composite milk plants and four rural creameries should be set up. These are likely to create an incentive among farmers to adopt measures to improve breeds and feed, and thus accelerate the pace of livestock development.

30. The poultry breeds in the State should be improved by establishing one poultry farm in each NES Block to demonstrate scientific poultry farming, and to spread high egg yielding breeds like Leghorns and Rhode Island Reds. Cooperatives should also be established to ensure efficient collection and distribution of egg production.

31. The investment required for the suggested development programme is estimated at about Rs. 8 crores.

32. By and large the pattern of investment suggested for livestock development is such that additions to output could be secured through improvement in livestock quality, which is essentially a long term process, rather than by measures yielding direct and immediate return.

33. The impact of the proposed programme on employment would also be mostly indirect. Besides creating many new jobs for technical personnel, it would enable the agriculturists to utilize their idle time profitably.

CSL

4. FORESTS

34. Orissa has 25,000 square miles (42% of total area) covered by forests. Of this, only 15,000 square miles, mainly in the hilly regions of the Northern Plateau and the Eastern Ghats, can be considered to be productive forest area.

35. The production of timber is about 17·7 million cu. ft., of which 44 per cent is exported. The annual consumption of firewood, estimated at 103 million cu. ft., is also supplied by the forests. The present yield of timber and firewood is about 50 per cent of the estimated optimum potential. About 2,455 square miles of bamboo forest yield roughly 180,000 tons per year, or only 25 per cent of the estimated potential production. Minor forest produce includes *kendu* leaves for *beedi*, and Sabai grass.

36. Large increase in the output of forest products is possible in Orissa and it offers scope for a large expansion of forest-based industries like paper mills and saw mills in the State. The first step in the development of forest resources is a detailed survey of the entire forest area. This will provide a basis for drawing up working plans for all the forest divisions.

37. A long term afforestation policy should be followed. Only the species most suitable for each area should be planted. There should be same emphasis on planting quick growing species, such as casuarina, cashew and eucalyptus which are suitable for the coastal regions. Dry *sal* areas are suitable for teak plantations. It is suggested that 450,000 acres should be afforested during 1961–71 at an estimated cost of about Rs. 4 crores. A systematic training programme for personnel required for afforestation should also be started.

38. The rate of extraction from forests should be stepped up by improving transport facilities and adopting better felling methods. It is suggested that 7,500 miles of forest roads should be constructed and existing roads be improved. The expenditure required is estimated at Rs. 4 crores.

39. Shifting cultivation which hinders exploitation and development of forest resources should be checked by persuading *podu* cultivators to adopt the practice of permanent agriculture. In some areas miscellaneous forests after *podu* cultivation are replaced by *sal* jungles. Such miscellaneous forests should be stockmapped and shifting cultivation utilized to raise *sal* forests in them.

40. A techno-economic study should be made to investigate the possibility of using improved hand tools for felling purposes. Also, modern methods of wood seasoning and wood preservation should be used. The Government should set up a seasoning kiln and wood preservation plant as part of the Government-owned mill at Rourkela.

41. With the implementation of the suggested programme, the net value of forest output would increase from Rs. 7 crores in 1961 to Rs. 13·5 crores in 1971. About 28 per cent of the additional net product would originate in the existing forests and the remainder from new plantations. The investment required is about Rs. 16 crores, of which half would be for afforestation and transport facilities, and the rest for improved practices.

5. FISHERIES

42. Orissa is a maritime State with a 250-mile coastline. Besides, it has 600 sq. miles of riverine area and several lakes, ponds and tanks. However, the fish resources are under-exploited, with

the result that the per capita availability of fish for the fish eating population was only 5·3 lbs. in Orissa as against 9·5 lbs. in all-India, in 1957-58.

43. The chief reasons for the backwardness of fishing industry in the State are inefficient and primitive techniques, inadequate exploitation of existing and potential resources, and lack of transport, and refrigeration and marketing facilities.

44. A programme for development of fisheries during the Third Plan is outlined. It is suggested that to develop marine fisheries, 100 well equipped mechanized boats should be used, preferably through Fishermen's Cooperatives, proper harbour facilities should be developed, especially at Chandbali, Mayapura, Paradip, Machgaon and Puri, and road links with markets should be constructed, particularly the one between Kujong and Paradip. Cold storage plants, manufacturing units for fish meal, and fish curing yards should also be established at these bases. A switch-over to nylon nets and improved gear with the use of mechanized boats would also help develop estuarine fishing. Riverine fisheries would develop if transport and marketing facilities were provided. In addition, culture fishing should be encouraged and 30,000 acres should be brought under fish cultivation during the Third Plan.

45. The formation of cooperative marketing societies and a State Fish Marketing Board, the provision of refrigerated trucks and insulated vans for transporting fish, and training centres to teach fishermen the techniques of handling mechanized boats are also suggested to facilitate the exploitation of the fish resources of Orissa.

46. The total investment to implement the programme suggested is estimated at Rs. 9 crores —Rs. 3 crores to be invested during Third Plan period and the remaining during the Fourth Plan period. Fish output is expected to increase from the present level of 24,500 tons to 51,000 tons by 1965-66 and to 100,000 tons by 1970-71.

47. About 10,000 tons of fish would be available for industrial consumption in 1970-71 and sea-fish-based industries like fish curing and manufacture of fish meal and fish oil could develop in the State.

6. MINERALS

48. One third of the State has not yet been geologically surveyed; but the proved mineral resources in the surveyed tracts are very abundant. Till recently, these resources were hardly exploited. In 1951, only 39,000 persons were employed in mining and its contribution to total net output was Rs. 4·5 crores or about 1·5 per cent of the total. Some growth of the mining activity occurred during the First Plan as indicated by the increase in employment to 50,000 in 1956-57. As compared to the other mineral-producing States, labour productivity in the mines of Orissa is low. This is largely attributed to the lower degree of mechanization in the mines, poor health of the workers, and the interruptions in operations caused by heavy rainfall.

49. Most of the mineral deposits occur in the four inland districts of Mayurbhanj, Keonjhar, Sundargarh and Sambalpur. The main good quality iron ore concentrations are in Keonjhar district and in Bonai area in Sundargarh district. Orissa has a third of the proved Indian reserves of high grade iron ore, and 40 per cent of the possible reserves. The known reserves of manganese ore are about 10 million tons or 8 per cent of the all-India estimate, and are located chiefly in Keonjhar and Sundargarh districts. The proved reserves of limestone are 50 to 60 million tons mainly in Sambalpur and Sundargarh districts and of coal about 800 million tons,

located mainly at Talcher in Dhenkanal district and Hinger-Rampur in Sambalpur district. The coal is however of the non-coking variety. In addition, depsoits of chromite, dolomite, china clay, fire clay, bauxite and other minerals are found scattered in the State.

50. The demand for minerals from industries and from foreign countries has grown in recent years. Nearer home, there are big plans for developing basic industries. To cater to these demands a rapid increase in the output of major minerals should take place in Orissa. A study of the production trends during 1950–57 indicates that a beginning in this direction has already been made.

51. The most significant development over the current decade should be in iron ore mining. It is estimated that in the Third and Fourth Plans an additional 12 million tons of ore would be required to meet the demand from Rourkela and Durgapur steel plants and the proposed plants at Bokaro and Bonaigarh, and about 10 million tons for export. Total production may be thus expected to increase from 4 million tons in 1961 to 26 million tons in 1971. This will require an investment of about Rs. 40 crores and an additional 140,000 workers in the iron mines. The output of manganese ore is estimated to increase from 400,000 tons in 1961 to 700,000 tons in 1971. On the basis of the probable growth of industries the output of coal should be increased from the present level of 600,000 tons to 3·9 million tons by 1971 through an investment of Rs. 15 crores and the employment of 30,000 additional workers. Considering the growth possibilities of cement, refractories, etc, the limestone output will have to be doubled over 1961–71. The additional production of 3·5 million tons will require an investment of Rs. 15 lakhs and create an employment potential of 14,000.

52. This growth of mineral production would increase the net product of mining from Rs. 8·98 crores in 1961 to Rs. 42·22 crores by 1971, and would require another 210,000 workers, of which one-third would be skilled and semi-skilled. The net output per worker in this sector would also increase from Rs. 1,380 in 1961 to Rs. 1,530 in 1971 due to better mining techniques. Of the Rs. 33 crores increase in net value of output of mining, 80 per cent would be in Sundargarh, Keonjhar and Mayurbhanj districts.

53. The prospective growth of the mineral industry in Orissa would require the fulfilment of several conditions. Firstly, the maximum development of mineral-based industries should take place near mineral deposits, and the export trade should be systematically expanded. Secondly, transport facilities connecting the mineral deposits to industrial centres and to the ports should be developed. Thirdly, the existing methods of mining should be improved and mechanized mining techniques adopted. Fourthly, scientific data about the deposits should be collected, research carried out and an effective mineral intelligence service developed. Fifthly, the Orissa Mining Corporation should undertake mining operation on a large scale without delay. Finally, the problem of supplying 72,000 skilled and semi-skilled workers to the mines by 1971 should be tackled and solved.

7. A PROGRAMME FOR LARGE SCALE INDUSTRY

54. Industrially, Orissa is among the more backward States in India. The share of the industrial sector in the total income generated in the State (8%) is much lower than in all-India (16·3%). This sector is also much more dominated by cottage industry in Orissa than

it is in all-India. Furthermore, the net output per worker in both factory and non-factory industry is lower in Orissa than in all-India.

55. The composition of the factory industry in 1956-57 in Orissa showed that agriculture-based industries were the most important followed by forest-based industries while mineral-based industries were relatively unimportant.

56. During the period 1956-57 to 1960-61 it is estimated that the net output of factory industry would increase by about 375 per cent. These developments would lay the foundation for vital change in the composition of factory industry and would, in fact, usher in a new era of industrial development in the State. This would be brought about mostly by steel and also by other industries such as, refractories, aluminium, ferro-manganese and cement. But in spite of these developments, even in 1961, large scale industry would contribute only 6 per cent of total net output in Orissa as against 8 per cent in all-India.

57. Considering the natural resources of Orissa in the context of the pattern of development envisaged for India as a whole, all-India demand trends, and availability of power, water, transport and labour, a programme for investing Rs. 550 crores in large scale industry has been suggested. The total additional output expected from this investment is Rs. 146 crores and the additional direct employment about 90,000. Mineral-based industries would account for roughly 88 per cent of the investment, 75 per cent of the additional net output, and 42 per cent of the additional employment. Metal-based industries would absorb 3 per cent of the total investment, and provide 10·8 per cent of additional net output and 27·4 per cent of the additional factory employment. Chemical industries which have 7·2 per cent of the investment in the programme would produce 9 per cent of the additional net output and employ 17·3 per cent of the additional factory workers.

58. About a quarter of the investment for 1961-71 would take place in the Third and the rest in the Fourth Plan. However, over 40 per cent of the additional net output for the decade would accrue in the Third Plan. Of the total investment in large scale industry, 82 per cent would be in the public sector, and all of it in the iron and steel industry.

59. The provision of social and economic overheads, such as, transport, power, technical education and public health measures, is necessary to facilitate not only the implementation of the industrialization programme recommended, but also for the growth of feeder and ancillary industries which is essential for the diversification of the industrial structure. Hence the development of the overheads for which suggestions have been made in this report should be given high priority.

60. Despite the growth of the metallurgical industry in the public sector, and the availability of overheads, the development of industries in the private sector may be hindered on account of lack of information, inadequate technological knowledge, and shortage of finance. To overcome these impediments assistance should be given. The Department of Industries should have a Development Wing staffed by competent engineers to advise entrepreneurs. An Industrial Investment Trust should also be established to encourage the middle class population and the ex-landlords and ex-rulers to invest their savings in industry. All efforts should also be made to simplify Government procedures as regards licences, permits and grant of loans and other assistance. The State Development Wing should offer guidance with regard to these procedures.

61. With the implementation of the programme suggested in this report, the net output

CSL

of large scale industry would increase from about Rs. 22·1 crores in 1961 to Rs. 179·4 crores in 1971 or by 710 per cent. Employment would be about 165,000 or 120 per cent above the 1961 level, and the output per worker would rise from Rs. 3,000 in 1961 to Rs. 10,000 in 1971. In addition the character of the industrial sector would be fundamentally changed. With the predominance of steel in the industrial structure the emphasis would have shifted from agriculture-based and consumer goods industries to producer goods and durable consumer goods industries.

8. LARGE SCALE INDUSTRIES WITH SCOPE FOR DEVELOPMENT

62. The future growth of agriculture-based industries depends on the rate of increase of population and per capita income on the one hand and the growth of agricultural production on the other. The future of the textile industry in Orissa is related more intimately to the first of these, and that of the food processing industries to the second. The cotton textile industry is not likely to grow substantially on account of the poor prospects for growing cotton in the State and the relative advantage of the industry in other regions. The large increase in agricultural production, however, indicates a rapid expansion of food processing industries.

63. Orissa is potentially rich in forest resources and with the future rise of incomes, the expansion of education and the growth of construction activities, the demand for furniture, paper, and timber is likely to increase. A rapid increase in forest-based industries, is, therefore, likely.

64. Orissa is one of the richest areas of the country in mineral deposits. Despite the recent development of mineral-based industries like steel, aluminium and ferro-manganese, the installed capacities are very small relative to the available mineral resources. In addition, a large increase in the demand for steel and the products of other mineral-based industries is expected. A considerable expansion in the capacity of steel production, besides that already planned for the Rourkela steel plant, is suggested to be achieved by installation of the new plant at Bonaigarh. The rise in steel production would increase the requirement of ferro-manganese and refractories. A large expansion of their production is also recommended. In addition, demand and resource considerations indicate the scope for development of ferro-chrome, ferro-silicon, ceramics and glass manufacture, for which plants are suggested.

65. Engineering industries which form the bulk of metal-based industries, are market oriented or are located in areas with skilled labour. With the growth of the steel industry, the development of hydro-electric power and the extension of transport facilities, the conditions encouraging metal-based industries will appear in Orissa. At the same time the demand for engineering products is expanding with rising incomes and urban development. An expansion of this group of industries, is, therefore, also recommended.

66. The coke-oven plants at Rourkela and later at Bonaigarh would produce a number of by-products which would be the basis for expansion of chemical industry. Plants for producing styrene, polystyrene, ammonium sulphate and nitrogenous fertilizers are suggested. The demand for these products is expected to expand considerably.

67. The bulk of the investment for the development of large scale industries suggested would take place in the triangular area with Cuttack at the apex and Rourkela and Hirakud at the

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

base. Steel, metal-based and chemical industries would centre around Rourkela and Bonaigarh; aluminium, engineering, paper, etc., around Hirakud; and engineering, ceramics, glass and others around Cuttack.

9. SMALL SCALE AND COTTAGE INDUSTRIES

A. *Cottage and Village Industry*

68. Compared with the factory industry, the non-factory industry is far more important in Orissa than in all-India. It contributes over 80 per cent of the industrial output of the State as against a little over 50 per cent in all-India. The ratio of factory to non-factory employment was 1:14 in the former as against 1:3·8 in the latter. The net output per worker in non-factory industries in Orissa (Rs. 494) was lower by one-third than the all-India average (Rs. 790) in 1956-57.

69. Despite the increase in demand for consumer goods resulting from the expected growth of population and per capita income, owing to the rapid expansion of factory industry in Orissa, and the price and quality differential existing in favour of factory products, the conclusion is that cottage and village industries will grow at a slower rate than that at which demand for consumer goods will rise. This is likely to happen despite Government efforts to encourage the growth of cottage industries.

70. Cottage industries which have scope for expansion are: *beedi*-making and hand pounding of rice. Handloom industry, being in direct competition with mill produce, is not likely to expand substantially.

71. It is estimated that the net output of cottage industry in Orissa will increase from Rs. 22·9 crores to Rs. 38 crores, and employment from 430,000 to 523,000 between 1960-61 and 1970-71. The proportion of industrial output originating in the cottage sector is, however, expected to decline from 47 per cent at the beginning of the decade to 15 per cent at the end.

B. *Small Scale Factory Industry*

72. Small scale factory industry provided only 1·5 per cent of total industrial employment, but over 25 per cent of the total factory employment in Orissa.

73. In the future industrial structure, the small factory is likely to occupy an important place. The demand for consumer goods output of small scale factory industries is likely to increase with rising population and income; of feeder and ancillary producer goods with the expansion of transport, agricultural production and construction activity. In addition, the expansion of education, medical facilities and urban drainage system will also increase the demand for a variety of articles that small scale industries are well fitted to produce.

74. The existing and potential agricultural, forest, and mineral resources available in the State are large enough to support a big expansion of small industries.

75. At present the growth of small scale industries is hindered by the inefficient techniques employed, the shortage of credit facilities and the scarcity of local skilled labour. These problems are likely to be reduced in intensity in the future on account of efforts being made to tackle them.

76. The Pilot Project started in 1957 holds great potentialities for assisting small industry development. The working of the project could, however, be improved by the appointment

GSL

of a Pilot Project Administrator with adequate technical staff to advise the Industries Department on matters relating to the administration of the Project and the prospective entrepreneur in technical and economic matters.

77. Considering profitability, demand, availability of raw materials, skills, transport and power, the establishment of 92 small plants during 1961–71 is suggested under the Pilot Project involving a total investment of Rs. 3 crores, and an additional employment of 3,566. Fifty-one of the plants suggested should be set up in the Third, and the remainder in the Fourth Plan. On account of the disposition of resource and overhead facilities, the pattern of location suggested for the new plants does not deviate from the pattern of existing location of small scale factories. In addition, about Rs. 6 crores would be invested in industrial estates, and the private sector could be expected to invest another Rs. 13·5 crores in small scale factory industry, bringing the total investment to Rs. 22·5 crores. Further, investment in cottage industries during the period 1961–71, may be of the order of Rs. 11·7 crores.

10. POWER

78. Orissa had about 3·5 per cent of the country's total installed capacity and accounted for 3·3 per cent of the country's generation at the end of March 1960.

79. The State has made remarkable progress in the field of electric power development during the course of the last decade (1950–60). The State's total generating capacity increased from nearly 10 MW at the end of 1950 to 264 MW by the end of 1960.

80. This has resulted in important shifts in the pattern of generation and consumption of electricity and improved the relative position of the State's power development as compared to the progress made all over India. The generation is now predominantly hydel-based. The share of industry's consumption of electricity in the State is higher than for the country as a whole.

81. The electric power development in Orissa has been faster than that of the country as a whole. As a result, annual per capita availability and consumption of electricity are already nearly 90 per cent of the corresponding indicators for the country.

82. There has been a big decline in the relative importance of industry-owned power plants for meeting the State's demand for electricity. Their share has come down to 22·6 per cent of the total.

83. In view of the scope for rapid development of raw material oriented industries, there will be a steep rise in the demand for electricity during the ten-year period 1961–71. The maximum demand will go up to 500 MW in 1966 and 860 MW in 1971. To meet this, installed capacity will have to be increased by nearly 800 MW.

84. The additional demand can be met from both hydro and thermal resources, both of which are available in plenty.

85. Planning for power has to be on a long term basis. Hydel-based projects take 7 to 8 years to yield benefits. It is therefore necessary to plan for power 8 to 10 years ahead.

86. The demand for power in the Third Plan cannot be met by developing hydel resources only. Hence a pit-head thermal station (initial capacity of 240 MW—to be expanded later to 360 to 400 MW) will have to be built at Talcher. This will supply nearly half the additional demand for the decade. The construction of this station is a matter of top priority; without

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

it, the power demand for the period 1963 to 1968 cannot be satisfied. The State is expected to need about 500 MW of hydel power during 1968–73.

87. Vigorous investigations are recommended during the Third Plan period, so that, by 1963, the State would be in a position to select the most economical hydel projects and initiate work on them. This will assure adequate supply of power in the concluding years of the Fourth Plan as well as for the subsequent Plans.

88. Existing transmission lines serve particular districts only and there is no inter-connection between the two power systems of Orissa—the Hirakud and the Duduma. Much attention will have, therefore, to be paid during the current decade to remedy this defect. Extra H.T. transmission line connection is recommended between Rayagada, Cuttack and Sambalpur.

89. An overall investment of nearly Rs. 184 crores will be necessary to implement the above programme. Of this, Rs. 85 crores will be required during the Third Plan.

11. TRANSPORT

90. Relative to its resources and area, transport in Orissa is poor. In 1957, there were 13·9 miles of railway and 246 miles of roads per 1,000 square miles of area in Orissa as compared to 27·3 miles of railway and 292 miles of roads in all-India. In addition, there were 652 miles of inland waterways.

91. Furthermore, the transport facilities in the State are not distributed well from the point of view of exploitation of resources. There are three railway routes along the three sides of the State and the existing road network and inland waterways are also concentrated in the coastal districts. The interior of Orissa where much of the mineral wealth of the State is located is thus relatively isolated.

92. The unevenly distributed road and inland waterways of Orissa are also poor in quality. Nearly 82 per cent of the roads are unsurfaced, and there are many breaks and interruptions in them on account of absence of bridges. The inland waterways are silted up and not properly maintained.

93. The inadequacy of transport facilities as regards extent, distribution and quality explains, in a large measure, why Orissa is a backward State despite its rich natural resources. It is also responsible for the relatively low agricultural prices since the surplus output cannot be transported out of a restricted area.

94. The development of large scale and heavy mineral-based industry envisaged for Orissa, requires the movement of huge volume of raw materials to producing centres and the distribution of the finished product over widespread markets. This industrial development cannot occur unless adequate transport facilities are provided in advance.

95. The existence of iron ore deposits favourably located for export, and a large forest area which is not fully exploited, are additional reasons for improving transport in the interior of Orissa.

96. Development of transport facilities has been undertaken in both the First and Second Plans, but the achievement so far is only a small part of what has to be accomplished. An accelerated programme of transport development is, therefore, necessary. The State Government proposes to spend about Rs. 10·5 crores on road development to construct 62 miles of

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

new roads and improve 1,388 miles of roads in the Third Plan. These targets are too low and must be stepped up. It is suggested that Rs. 17·2 crores should be spent to construct 3,097 miles of roads during the Third Plan.

97. In addition, to facilitate the exploitation of forest resources, forest road mileage should be increased from the existing 2,775 miles to 10,275 miles by constructing 2,500 miles of roads in the Third Plan and 5,000 miles in the Fourth Plan. The existing roads should also be improved. The estimated total cost of this programme is Rs. 4 crores.

98. As regards railway development it is suggested that four connecting links should be constructed. A 17-mile line from the Tomka-Daiteri iron deposits to the main line of the South Eastern Railway and a siding to transfer the ore to the canal head would facilitate the export of ore to Paradip. A line from Sambalpur to Titlagarh would provide a direct route to Visakhapatnam, and another from Dumaro to Talcher would shorten the distance between Rourkela and Cuttack. A line from Cuttack to Paradip together with a 30-mile track connecting Gua and Manoharpur would facilitiate the export of Keonjhar iron ore and manganese through Paradip port. The total expenditure for constructing these lines is estimated to be Rs. 30·4 crores.

99. An expenditure of Rs. 4·5 crores should also be incurred on improving and deepening the inland waterways and the terminal facilities at Jonapur and Paradip during the Third Plan.

100. Advantage should be taken of the favourable natural features and geographical location of Paradip to develop it into a major deep-sea port.

101. The total investment required for the implementation of the suggested programme is about Rs. 60·8 crores. About 50 per cent of this will be on railway development, 35 per cent on road development and the remainder on bridge construction, and the development of road transport and inland waterways. The implementation of the programme would be facilitated if the larger number of Government agencies at present concerned with the different aspects of transportation were reduced.

102. The suggested development programme, if carried out by 1966, would create transport facilities sufficient to meet the requirements necessary for the anticipated developments during the Fourth Plan.

12. MANPOWER

103. It is estimated that the programme of development suggested for the non-agricultural sector in this report would require additional manpower of the order of 1·40 million by 1971.

104. As against this requirement, the supply of manpower during the same period would be roughly 1·46 million.

105. Agriculture, for which a programme of development resting mainly on intensive cultivation is suggested, would also require additional manpower. If these requirements were also to be met the additional labour force in the State would not be adequate.

106. This problem of manpower shortage could be best resolved by reducing labour requirements in the agricultural sector. This can be done by bringing about organizational improvement and by using labour-saving devices.

107. This course of action has a further advantage in that it would result in a greater increase in agricultural productivity. If the programme for the non-agricultural sector suggested in this report is fully implemented it would result in a per worker net output of Rs. 1,840 in that

sector. This would be much higher than the net output per worker in agriculture (Rs. 609). The shortage of labour in agriculture would necessitate introduction of capital intensive methods of production in agriculture.

108. In the absence of this line of development, a part of the manpower requirement in the non-agricultural sector would have to be met by immigrant labour.

109. If labour-saving appliances are introduced in agriculture, though additional labour force may not be released for non-agricultural activities, the labour productivity in agriculture could increase and the difference in productivity between the two sectors will be reduced.

110. It is, therefore, suggested that a study should be made to identify agricultural operations where labour-saving devices can be applied and a campaign should be carried out to educate the farmers to accept these devices.

111. A part of the requirement of manpower would be for technical personnel. It is estimated that 1,040 engineers and diploma holders and 11,000 craftsmen would be required annually during the next ten years. As against this, the annual supply of engineers and diploma holders would be 615 and of craftsmen 2,560 in 1961.

112. It is recommended that training facilities should be provided in the early part of the Third Plan period to bridge this wide gap. For training craftsmen progressively greater responsibility should be taken by industry. In order to encourage this, a committee with representatives of the Industries Department, industrialists and training schools should be formed. This committee should plan the training programme after periodically evaluating the requirements for various types of skill in the State. The large public sector in the State should give the lead in this programme of in-plant training.

13. PUBLIC HEALTH

113. Public health conditions in Orissa are poorer than in most other States in India. This is indicated by the fact that the death rate in Orissa (33·3 per 1000) in 1941–50 was 16 per cent higher than the average for all-India (28·5). About 60 per cent of the deaths in the State were accounted for by fever (including malaria).

114. Among the major economic effects of poor health conditions are the loss to society of the investment made in bringing up those young ones who die before they can participate in productive activity, and the generally low level of efficiency prevailing in the various sectors of the economy.

115. One of the underlying causes of poor health of the people is dietary deficiency, mainly shortage of proteins and vitamins. Other causes are lack of modern sanitation facilities and protected water supply even in the urban areas, and the inadequate medical and health facilities in the State.

116. The attempts that have been made in the First and Second Plans to improve prevailing health standards are not only very modest when viewed against requirements, but also small compared to the average all-India effort measured in terms of per capita expenditure.

117. It is suggested, therefore, that the per capita allocation for public health programme in Orissa during 1961–71 should be brought up to the all-India level. This would imply an expenditure of Rs. 49·7 crores in the next ten years.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

118. About Rs. 1·3 crores of this should be spent on malaria and filaria control. An expenditure of Rs. 3 crores on protected water supply and Rs. 14·4 crores on modern drainage and sanitation facilities, is also suggested for important urban centres especially industrial towns. A large programme for training medical and health service personnel should be started. A thousand primary health units, each covering 1,000 persons, should also be established. The estimated cost for both these programmes is Rs. 20·5 crores. A sum of Rs. 4·3 crores should be devoted to the construction of hospitals and dispensaries in the State. Mobile health units for inoculation and vaccination, sanitoria for tuberculosis control, and maternity and child welfare centres should also be established. In addition, health publicity should be stepped up, experimental programmes for reducing existing dietary deficiencies should be started, and the collection of vital statistics should be put on a sound basis.

14. FINANCIAL RESOURCES

119. The experience of the Orissa Government in implementing the Second Plan has highlighted the problem of inadequate resources that has inevitably to be faced by any backward region trying to accelerate its economic development.

120. Per capita revenue from State taxes in Orissa in 1957-58 was Rs. 4·07—the second lowest in India, the lowest being Jammu and Kashmir's at Rs. 2·04. Not only is per capita revenue from State taxes low in Orissa, but the ratio of State taxes to State income also is low compared to many other States. The ratio was 1·6 : 1·1 in 1956-57 and about 2·6 per cent in 1960-61. This low ratio may be taken to indicate a relatively low tax effort by the State.

121. Total revenue of Orissa Government has increased by about 200 per cent between 1951-52 and 1959-60 (B.E.) but revenue from State taxes has increased only by 62 per cent. It is the grants from the Centre and shared taxes that have contributed most to the increase in revenues. The low rate of increase of State tax revenue is due to (*a*) the inelasticity of the land revenue system, and (*b*) the relatively late emergence of the commercial taxes as a source of revenue.

122. If we consider revenue expenditure alone, in Orissa, the share of development expenditure has been increasing since 1951-52. However, if total expenditure is taken into account, the share of development expenditure has fallen from 75 per cent in 1951-52 to 62·8 per cent of the total in 1957-58. Thus the share of non-development expenditure has increased. The bulk of the increase in non-development expenditure is accounted for by payment of interest and repayment of debt. Payment of interest is already quite large and in 1957-58 constituted about 15 per cent of current revenues (excluding income from investments). Much of the interest due to the Centre is met through fresh loans. Added to this are the repayment obligations mostly to the Centre. There is no doubt that the State Government has to examine the whole question of its debt and the proper management of it in the future.

123. The greater part of the debt of Orissa Government consists of loans from the Central Government. This is primarily due to the fact that Orissa could not raise on its own the resources needed for huge projects like the Hirakud multipurpose scheme. In future, the State should try to preserve a better balance between loans from the Centre and market loans.

124. Though the general sales tax has become of late an important source of revenue in

Orissa, compared with all-India, Orissa relies more on land revenue than on the general sales tax. The State has as yet only a small industrial structure and a small urban population. However, in the Third and Fourth Plan periods, a complex of industries is likely to grow up based on the mineral resources of the region. In this situation, the fiscal structure must rely for some time to come on the taxation of the agricultural sector. At the same time elements should be introduced into the structure which would enable the State to benefit from the subsequent growth of the secondary and tertiary sectors. Therefore, attention should at this stage be devoted both to the improvement of land taxation and the rationalization of the structure of commercial taxes, especially the general sales tax.

125. The land revenue system of the present Orissa State has not yet become integrated and uniform. In the peculiar conditions obtaining in the State, resettlement operations would be preferable to simple standardization as recommended by the Taxation Enquiry Commission.

126. When land ceilings are imposed, the agricultural income tax, in its present form, will have to be given up. However, a progressive surcharge on land revenue may be imposed on holdings above, say, 5 acres.

127. Lands used for non-agricultural purposes must be specially assessed according to the recommendations of the Taxation Enquiry Commission.

128. As regards sales tax, the problem at the moment is to discover what system of sales taxation is best suited to conditions obtaining in Orissa. At present, there is a single-point tax levied at the last stage of sale. A multi-point levy may be more suitable for Orissa at the present stage of its development.

129. Recently, a tax has been imposed on some goods carried by roads and inland waterways. In course of time, this tax may be applied to passenger fares.

130. Additional taxation can also be related to direct benefits that can be shown to have flowed from public investment. Betterment levy is an instance. There is considerable scope for this levy in Orissa. The implementation of the Betterment Charges Act, 1955 ran into difficulties because the levy was related to increases in capital value which it was almost impossible to estimate. It can be shown that the usual way of assessing betterment contributions is likely to impose hardships on the small owners. It is suggested that the period of payment be made longer and the levy related to the cost of the undertaking rather than the presumed increase in capital value.

131. The arrangements for financing the Hirakud project have been such as to lead the State Government to assume debt obligations clearly beyond its capacity to discharge. Unless some arrangement is made with the Centre in regard to the debt incurred on account of Hirakud and unless determined efforts are made to increase revenues, it would be unwise to embark upon large scale borrowing for further investment. Indeed this may not be possible, as new loans may be used up in paying off old loans.

132. The total yield of State taxes in Orissa was expected to be Rs. 8·24 crores in 1959-60. Even if this were increased by 50 per cent, the additional revenue would be small in absolute terms—Rs. 4 crores. Compared with the (recommended) annual outlay of about Rs. 60 crores during the Third Plan period, it is apparent that additional taxation can play only a limited role. Every effort has to be made to find additional non-tax revenues, though there are definite limitations to the use of public enterprises as a source of revenues to the Government.

133. The surplus that can form the basis of capital formation in Orissa consists of the revenue

from the sale of the products of agriculture, forests and extractive industries. The State can play an useful role in utilizing this surplus for capital formation.

134. Steps to be taken:

(*a*) Consistent with all-India policies, the State may be allowed to make a normal profit on the sale of surplus foodgrains not at the expense of consumers but at the expense of middlemen.

(*b*) More business-like disposal of minor forest produce—revision of price where necessary, e.g., bamboos—afforestation.

(*c*) Further development of the Orissa Mining Corporation.

(*d*) Increase the profits of electricity undertakings, as with increase in installed capacity, a more or less proportionate increase may be expected.

135. The report envisages a total programme of investment in the State of the order of Rs. 1,430 crores in 1961–71. Of this total, it is estimated that roughly Rs. 576 crores of investment will fall within the State sector. In other words, the State Government will be called upon to find resources of this magnitude in the ten-year period, 1961–71.

136. Tentative estimates show that the State Government would be able to raise about Rs. 203·2 crores in 1961–71, after allowing for additional taxation amounting to Rs. 46 crores, and market loans and share of small savings amounting to Rs. 73·8 crores. There would thus arise a gap of Rs. 372·8 crores which has to be met through Central assistance, if the programme recommended is to be implemented within the ten-year period. In addition, the State would have to find resources also for the current outlay under the Plans which has not been included in our estimate of financial requirements.

15. PATTERN OF GROWTH

137. The total investment required to implement the programme of development proposed for 1961–71, in this report is estimated at Rs. 1,427 crores.

138. Of the total investment, 39·3 per cent would be in factory industry, 21·7 per cent in agriculture and allied activities, 21·3 per cent in tertiary activities, 12·9 per cent in power, 4 per cent in mining and 0·8 per cent in non-factory industry. Compared to the estimated investment during the preceding decade (1951–61), the largest increases are proposed for power and tertiary activities, thus emphasizing the need for strengthening the infra-structure of the economy of the State.

139. Of the total investment, 76.9 per cent would be in the public sector. The contribution of CentralGovernment in it would be 47·5 per cent. The bulk (86%) of the Central Government investment in Orissa would be in iron and steel industry. Agriculture, power and transport development would be the main fields for investment by the State Government. One-third of the private investment would be in industry, the remaining being mainly in agriculture and housing.

140. The main impetus for the rapid growth of the State's economy during 1961–71 would come from the development of heavy and metallurgical industries, mainly iron and steel industry. Over this period, the industrial output is expected to increase eight-fold, the mineral-based industries contributing about three-fourths of the additional net output of industry. Significant improvement is anticipated in the structure and productivity of factory industry.

141. The bulk of the industrial growth would occur in the triangular area with Cuttack at the apex and Rourkela and Hirakud as the base.

142. Development of mining in Orissa is geared both to the development of mineral-based heavy industry and the expansion of iron ore exports. With an accelerated growth of mining output at the rate of 37 per cent per annum during 1961–71, the share of mining in the State net output would increase from 2·3 per cent to 4·7 per cent.

143. A substantial sum of Rs. 184 crores or 12·9 per cent of total investment has been allocated for power development, and an installed capacity of about 1,000 MW by 1971 is proposed, to meet the effective power demand during the decade.

144. An investment of Rs. 105·8 crores is proposed for development of transport and communications, and another Rs. 199·7 crores for other tertiary activities mainly for health and housing. Growth in tertiary output is expected to be 14 per cent per annum—the same as the increase of commodity output.

145. An investment of Rs. 276 crores is proposed for agricultural development in Orissa, of which Rs. 62·4 crores would be private investment and the remaining by the State Government. The agricultural output is expected to increase at the rate of 6·5 per cent per annum—the same as in all-India. By 1971, the State would be exporting about 1·8 million tons of foodgrains to other States after meeting its own requirements. This development is to be preceded by an effective price policy chiefly in respect of rice.

146. There is possibility of shortage of manpower in agriculture, especially if there is an exodus of workers to non-agricultural occupations in which productivity is higher. To meet this shortage, immigration of labour from other States may have to be encouraged to some extent. Alternatively labour-saving techniques may have to be adopted in agriculture.

147. The development programme underlines the necessity of training a large number of industrial workers and technicians. It is estimated that the annual outturn of engineers and diploma holders from the existing training institutes would fall short of the requirement by 70 per cent. The shortage of technical personnel may have to be met by recruitment from other States.

148. With development of this magnitude, the State income is expected to grow at the rate of 14 per cent per annum during 1961–71. Per capita income will almost double from Rs. 212 to Rs. 420—reaching the all-India level in 1971. The share of agriculture in State income will fall from 50·5 to 30·3 per cent and that of industry would go up from 5·9 to 20·0 per cent.

149. The shift of working force from low productivity sectors to high productivity sectors would raise average productivity. The major increase in productivity (about 250%) would be in factory industry, due mostly, to the predominance of metallurgical industries. In other sectors productivity per worker would increase by about 50 per cent.

150. The programme of development envisaged in this report would transform Orissa from a relatively backward agricultural economy into a progressive industrial State.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL 193

Tables

GL

TABLE 1

AREA AND POPULATION DENSITY IN ORISSA, 1951

District	*Area* (sq. miles)	*Total Population*	*Density of Population*
1. Balasore	2,462	1,106,012	449
2. Bolangir	3,444	917,875	267
3. Cuttack	4,224	2,529,244	599
4. Dhenkanal	4,181	839,241	201
5. Ganjam	4,835	1,624,829	336
6. Kalahandi	5,086	858,781	169
7. Keonjhar	3,211	588,441	183
8. Koraput	9,875	1,269,534	129
9. Mayurbhanj	4,025	1,028,825	256
10. Phulbani	4,270	456,895	107
11. Puri	4,001	1,573,000	393
12. Sambalpur	6,767	1,301,804	192
13. Sundargarh	3,755	552,203	147
TOTAL	60,136	14,645,946	244

SOURCE: *Census of India, 1951.*

TABLE 2

DISTRIBUTION OF POPULATION IN VILLAGES AND TOWNS OF DIFFERENT SIZES—ALL-INDIA AND ORISSA, 1951

	All-India					*Orissa*				
Size of Village or Town	*Number of Villages or Towns*	*Percentage*	*Population*	*Percentage*	*Average*	*Number of Villages or Towns*	*Percentage*	*Population*	*Percentage*	*Average*
Rural (Villages)										
Less than 500	380,019	68	78,347,691	27	206	40,654	84·00	7,265,533	52	179
500–1000	104,268	19	72,920,756	25	699	15,852	12·09	4,030,961	29	688
1000–2000	51,769	9	71,050,482	24	1,374	1,652	3·40	2,141,301	15	1,296
2000–5000	19,896	4	47,060,497	19	2,868	237	0·50	596,650	4	2,517
Above 5000	2,136	0·4	15,518,845	5	7,265	3	0·01	17,431	0·1	580
TOTAL	558,088	100	295,004,271	100	529	48,398	100·00	14,051,876	100	290
Urban (Towns)										
Less than 5,000	611	20	2,030,159	3	3,323	1	2·56	4,956	0·83	4,956
5,000–10,000	965	32	5,253,108	9	5,438	23	58·97	178,415	30·04	7,757
10,000–20,000	856	28	11,680,768	19	13,646	8	20·52	107,796	19·14	13,476
20,000–50,000	401	13	11,804,047	19	29,436	5	12·82	138,055	23·24	27,611
50,000–100,000	111	4	7,555,324	12	68,066	1	2·56	62,343	10·49	62,343
Above 100,000	73	3	23,551,617	38	322,625	1	2·56	102,505	17·25	102,505
TOTAL	3,018	100	61,875,123	100	20,502	39	100·00	594,070	100·00	15,233

SOURCE: *Census of India, 1951.*

GSL

TABLE 3

URBAN POPULATION AS PERCENTAGE OF TOTAL POPULATION BY DISTRICTS, 1951

District	*Urban Population as Percentage of Total Population*
1. Balasore	3·8
2. Bolangir	4·4
3. Cuttack	5·4
4. Dhenkanal	3·3
5. Ganjam	7·0
6. Kalahandi	1·4
7. Keonjhar	1·6
8. Koraput	4·3
9. Mayurbhanj	0·9
10. Phulbani	1·2
11. Puri	4·8
12. Sambalpur	3·9
13. Sundargarh	2·7
TOTAL	4·1

SOURCE: *Census of India, 1951.*

TABLE 4

PROPORTION OF SELF-SUPPORTING PERSONS AND EARNING DEPENDENTS TO TOTAL POPULATION IN ORISSA AND OTHER STATES, 1957

States	*Self-Supporting*		*Earning Dependents*		*Earners*	
	Total (million)	*Percentage of Total Population*	*Total* (million)	*Percentage of Total Population*	*Total* (million)	*Percentage of Total Population*
1. India	104·40	29·3	37·94	10·6	142·34	39·9
2. Andhra Pradesh	8·34	26·7	3·49	11·2	11·83	37·9
3. Assam	2·41	26·6	1·29	14·2	3·70	40·8
4. Bombay	12·93	26·8	8·63	17·9	21·56	44·7
5. Bihar	12·16	31·4	1·56	4·0	13·72	35·4
6. Madhya Pradesh	8·19	31·4	4·87	18·6	13·06	50·0
7. Madras	7·85	30·1	1·12	4·3	8·97	34·4
8. *Orissa*	*4·18*	*28·8*	*1·42*	*9·8*	*5·60*	*38·6*
9. Rajasthan	5·90	37·0	2·13	13·4	8·03	50·4
10. West Bengal	8·38	31·8	0·36	3·3	9·24	35·1

SOURCE: *Census of India, 1951.*

CSL

TABLE 5

NUMBER OF FEMALE EARNERS PER 100 MALE EARNERS IN ORISSA BY DISTRICTS, 1951

District	*Earners*				*Number of Female Earners Per 100 Male Earners*
	Number of Males	*Percentage of Total Population*	*Number of Females*	*Percentage of Total Population*	
1. Balasore	305,831	27·7	79,850	7·2	26·109
2. Bolangir	263,339	28·7	139,810	15·2	53·091
3. Cuttack	721,242	28·5	183,310	7·2	25·416
4. Dhenkanal	241,018	28·7	85,499	10·2	35·474
5. Ganjam	424,478	26·1	135,196	8·3	31·850
6. Kalahandi	238,927	27·8	129,179	15·0	54·066
7. Keonjhar	161,518	27·4	28,630	4·9	17·726
8. Koraput	334,041	26·0	67,873	5·3	20·319
9. Mayurbhanj	300,822	29·2	221,863	17·0	52·349
10. Phulbani	137,363	30·1	25,482	5·6	18·551
11. Puri	435,884	27·7	106,181	6·8	24·360
12. Sambalpur	423,813	32·6	221,863	17·0	52·349
13. Sundargarh	157,613	28·5	75,395	13·7	47·836
TOTAL	4,145,889	28·3	1,450,053	9·9	34·976

SOURCE: *Census of India, 1951.*

TABLE 6

DISTRIBUTION OF EARNERS BY INDUSTRIAL STATUS IN ALL-INDIA AND ORISSA, 1951

Sectors	*All-India*		*Orissa*	
	Number (thousands)	*Percentage*	*Number* (thousands)	*Percentage*
1. Agriculture, Animal Husbandry and Ancillary Activities	102,711	71·8	3,975	71·0
2. Forestry	350	0·2	22	0·4
3. Fishery	579	0·4	44	0·8
Total of Agriculture, Forestry and Fishery	*103,640*	*72·4*	*4,041*	*72·2*
4. Mining	780	0·5	21	0·4
5. Factory Establishments	22,967	2·1	24	0·4
6. Small Enterprises and Construction	11,521	8·0	434	7·8
Total Mining, Manufacturing and Hand Trades	*15,270*	*10·6*	*479*	*8·6*
7. Communications	195	0·1	5	0·1
8. Railways	1,178	0·8	13	0·2
9. Organized Banking and Insurance	147	0·1	3	0·1
10. Other Commerce and Transport	9,533	6·7	252	4·5
Total of Commerce and Communications	*11,053*	*7·7*	*273*	*4·9*
11. Professions and Liberal Arts	6,425	4·5	526	9·4
12. Government Services (Administration)	3,886	2·7	71	1·3
13. Domestic Service	2,947	2·1	206	3·7
Total of Other Services	*13,258*	*9·3*	*803*	*14·4*
TOTAL EARNERS	143,221	100·00	5,596[a]	100·00

[a] This figure includes 70,000 earners who depend on income from pensions, begging and other unproductive activities.

SOURCE: For India: Final Report of National Income Committee, February 1954. For Orissa: NCAER estimates (Table 8).

TABLE 7

SECTORAL DISTRIBUTION OF THE NET OUTPUT IN ORISSA AND ALL-INDIA, 1956-57

Sector	*Contribution to Total Output* (Percentages)	
	Orissa[a]	*All-India*[b]
Agriculture and Allied Activities	54·5	49·8
Mining	2·0	1·0
Industry	11·3	16·4
Tertiary Activities	32·2	32·8
TOTAL	100·0	100·0

[a] NCAER estimates of State Income for Orissa (*vide* Table 8 and Appendix 2).

[b] Central Statistical Organization.

TABLE 8

STATE INCOME OF ORISSA FOR THE YEARS 1950-51, 1956-57 AND 1960-61 (AT 1956-57 PRICES)

(Rs. crores)

Sector	*1950-51*		*1956-57*			*1960-61*			
	Net Output	*Per cent of Share in Total*	*Net Output*	*Per cent of Share in Total*	*Percentage Increase or Decrease over 1950-51*	*Net Output*	*Per cent of Share in Total*	*Percentage Increase or Decrease over 1957-58*	*Percentage Increase or Decrease during 1950-51 to 1960-61*
1. Agriculture and Allied Activities									
(*i*) Cultivation	139·92	48·8	147·57	47·7	+5·5	164·74	44·2	+11·2	+17·8
(*ii*) Animal Husbandry	18·42	6·4	14·43	4·7	−23·9	14·43	3·9	..	−21·6
(*iii*) Forestry	5·46	1·9	4·98	1·9	−8·8	6·97	1·9	+40·0	+27·7
(*iv*) Fisheries	1·60	0·6	1·76	0·5	+10·0	1·85	0·5	+5·1	+15·6
(*A*) *Total Agriculture*	*165·40*	*57·7*	*168·74*	*54·5*	*+2·0*	*187·99*	*50·5*	*+11·4*	*+13·6*
2. Mining	4·52	1·6	6·40	2·0	+41·6	8·98	2·4	+40·3	+98·7
3. Factory Establishments	3·07	1·1	4·84	1·6	+57·7	22·10	5·9	+356·6	+619·9
4. Power	·02	..	·06	..	+200·0	3·36	0·9	+5,500·0	+16,700·0
5. Non-factory Enterprises	20·05	7·0	22·24	7·2	+11·1	24·51	6·6	+10·1	+22·5
6. Construction (All types)	2·55	0·9	7·66	2·5	+200·4	11·95	3·2	+56·0	+368·6
(*B*) *Mining, Manufacturing, etc.*	*30·21*	*10·6*	*41·22*	*13·3*	*+36·4*	*70·90*	*19·0*	*+720·0*	*+134·8*
7. Transport and Communications	4·37	1·5	4·69	1·5	+7.3	5·78	1·5	+23·2	+32·3
8. Trade and Commerce	33·06	11·5	35·47	11·5	+7·3	43·74	11·7	+23·3	+32·3
9. Other Services	41·55	14·5	46·12	14·9	+11·0	49·81	13·4	+8·0	+19·9
10. House Property	12·00	4·2	13·32	4·3	+11·0	14·39	3·9	+8·0	+19·9
(*C*) *Total Services*	*90·98*	*31·7*	*99·60*	*32·2*	*+9·47*	*113·72*	*30·5*	*+14·2*	*+25·0*
(*D*) *Total State Income* (million *Rs.*)	*286·59*	*100·0*	*309·56*	*100·0*	*+8·0*	*372·61*	*100·0*	*+20·4*	*+30·0*
(*E*) *Population* (million)	*14·65*		*16·26*		*+11·0*	*17·57*			*+19·9*
(*F*) *Per Capita Income* (*Rs.*)	*196*		*190*		*−3·0*	*212*			*+8·2*

NOTE: For methodology of estimates of income, *vide* Appendix 2.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

TABLE 9

ESTIMATE OF INVESTMENT IN ORISSA DURING 1950-51 TO 1956-57 AND 1957-58 TO 1960-61

(Rs. crores)

Sectors	1950-51 to 1956-57					1957-58 to 1960-61				
	Centre's Share	*State's Share*	*Total Public Sector*	*Private Sector*	*Total*	*Centre's Share*	*State's Share*	*Total Public Sector*	*Private Sector*	*Total*
1. Agricultural and Allied Activities	31·70	6·52	38·22	11·76	49·98	..	25·02	25·02	7·84	32·86
2. Mining	..	..	..	5·64	5·64	0·25	0·25	0·50	7·24	7·74
3. Factory Industries	4·50	1·40	5·90	10·40	16·30	145·50	0·84	146·34	71·46	217·80
4. Power	0·40	..	0·40	..	0·40	..	33·00	33·00	..	33·00
5. Small Scale and Cottage Industry	..	0·74	0·74	3·64	4·38	..	0·95	0·95	3·59	4·54
6. Transport and Communications	..	..	4·20	1·45	5·65	..	3·88	3·88	4·75	8·63
7. House Property	..	0·49	0·49	21·95	22·44	..	2·74	2·74	15·45	18·19
8. Trade and Commerce	..	..	..	0·22	0·22	..	..	..	0·41	0·41
9. Education	..	0·56	0·56	..	0·56	..	1·16	1·16	..	1·16
10. Health	..	1·14	1·14	..	1·14	..	2·14	2·14	..	2·14
11. Backward Class Welfare	..	0·68	0·68	..	0·68	..	0·98	0·98	..	0·98
TOTAL	36·60	11·53	52·33	55·06	107·39	145·75	70·96	216·71	110·74	327·45

NOTE: On the basis of these estimates, capital-output ratio may be worked out for the two periods. The output figures are:

Period	*Total Investment/Output*	*Capital Output ratio*
1. 1950-51 to 1956-57	$\frac{107{\cdot}39}{22{\cdot}97}$	4·7 : 1
2. 1956-57 to 1960-61	$\frac{327{\cdot}45}{63{\cdot}05}$	5·2 : 1

TABLE 10

CONSTRUCTION EXPENDITURE IN ORISSA DURING 1950-51 TO 1956-57 AND 1957-58 TO 1960-61

(Rs. crores)

Sectors	*Construction Expenditure 1950-51 to 1956-57*	*Total Investment during 1957-58 to 1960-61*	*Construction Expenditure during 1957-58 to 1960-61*	*Construction Expenditure as Proportion of total investment* (Per cent)
1. Agriculture	36·47	32·86	26·29	80·0[a]
2. Mining	0.15	7·74	0·39	5·0
3. Factory Industires	8·04	217·80	62·07	28·5
4. Power	0·32	33·00	26·40	80·0
5. Small Scale Industries	0·74	4·54	1·50	33·0
6. Transport and Communications	4·30	8·63	3·45	40·0
7. House Property	12·24	18·19	18·19	100·0[b]
8. Trade and Commerce	0·30	0·41	0·41	100·0
9. Education	0·56	1·16	1·16	100·0
10. Health	1·14	2·14	2·14	100·0
11. Backward Class Welfare	0·68	0·98	0·98	100·0
TOTAL	64·94	327·45	142·98	43·6

[a] Cost of construction of dams. [b] Total road expenditure.

NOTE: The total investment during the first period (1950-51 to 1956-57) was Rs. 107·39 crores and construction expenditure Rs. 64·94 crores. Construction expenditure is 60·5 per cent of the total investment. During the second period (1957-58 to 1960-61) this proportion is 44 per cent, the total investment and construction expenditure being Rs. 327·45 crores and Rs. 142·98 crores respectively.

TABLE 11

AVERAGE YIELD PER ACRE OF MAJOR CROPS IN ORISSA AND ALL-INDIA, 1955-58

Crops	*Orissa* (lbs. per acre)	*All-India* (lbs. per acre)	*Orissa as per cent of India*
1. Rice	776[a]	754	103
2. Oilseeds	277	441	62
3. Pulses	487	423	115
4. Jute	864	935	92
5. Sugarcane (Gur)	3,663	3,013	122
6. Other Cereals and Millets (including Wheat)	390	477	82

[a] The figures have been obtained by dividing the estimated rice production of 1959-60 by the area devoted to it in that year. The estimate of production is based on crop cutting surveys conducted by the State Government. The figure is close to the estimated yield based on a recent sample survey undertaken by the Bureau of Statistics. The survey yields a figure of 15·5 maunds per acre of paddy which when multiplied by a 64 per cent average recovery, gives 812 lbs. of rice.

SOURCE: *Abstract of Agricultural Statistics*, Ministry of Food and Agriculture, Government of India.

GSL

TABLE 12

AREA UNDER PRINCIPAL CROPS AND THEIR CONTRIBUTION TO TOTAL AGRICULTURAL OUTPUT, 1955-56

Crops	*Percentage of Total Cropped Area in 1955-56*[a]	*Percentage of Total Value of Agricultural Output in 1956-57*[b]
1. Rice	62·3	74·2
2. Wheat	0·1	0·1
3. Millets and Other Cereals	2·0	2·1
4. Pulses	7·8	6·8
5. Oilseeds	3·4	1·9
6. Jute	0·7	1·5
7. Sugarcane	0·4	2·0
8. Tobacco	0·1	0·5
9. Cotton	0·2	0·03
10. Others	23·0	10·87
TOTAL	100·0	100·0

[a] *Statistical Abstract of Orissa*, 1957

[b] NCAER estimates of State Income of Orissa.

TABLE 13

IRRIGATION POTENTIAL IN ORISSA—MAJOR AND MEDIUM PROJECTS

Region and District	*Potential* (Thousand acres)	*Percentage of Total*
1. *Coastal Districts*		
Cuttack	1,167	45
Puri	791	
Balasore	532	
Ganjam	253	
2. *Northern Plateau*		
Mayurbhanj	766	15·5
Sundargarh	36	
Keonjhar	132	
3. *Central Table-land*		
Sambalpur	815	25
Bolangir	190	
Dhenkanal	526	
4. *Eastern Ghats*		
Phulbani	122	14·5
Koraput	486	
Kalahandi	229	

SOURCE: *Irrigation Potential of Orissa*, Irrigation Department, Orissa.

TABLE 14

IRRIGATION SCHEMES FOR THIRD AND FOURTH PLANS

Name of Scheme	*Location* (*District*)	*Catchment Area* (Sq. miles)	*Normal Monsoon Rainfall June-October* (Inches)	*Irrigation Potential* (Thousand acres)	*Approximate Cost* (Rs. lakhs)
(1)	(2)	(3)	(4)	(5)	(6)
1. Upper Khadakai Project	Mayurbhanj	195	47·12	40·5	203
2. Lower Khadakai Project weir at Radhanagar	,,	485 (Int. 195)	47·12	24·8	124
3. Suharneekha Project	Balasore and Mayurbhanj	6,078·5 (Int. 190)	47·12	640·8	3,204
4. Burabalang Project	Mayurbhanj	519·5 (Int. 233)	51·81	78·5	390
5. Paharajpur Project	Balasore	6,900 (Int. 5677)	47·12	103·12	516
6. Saluchua Tangana Project	Balasore and Mayurbhanj	198	51·81	54·1	271
7. Ordai Project	Keonjhar	205	45·56	35·2	176
8. Khairibhaban-Dev. Project	Mayurbhanj	316	45·56	56·0	280
9. Bhimkund Project	Keonjhar, Balasore and Cuttack	2,370	45·56	205·5	1,028
10. Kusai Project	Keonjhar and Cuttack	182	45·56	24·3	122
11. Upper Brahmani Project	Sundargarh	8,576	50·38	36·0	180
12. Kankra Project	Sambalpur and Dhenkanal	124	50·38	7·2	36
13. Rengali Project	Dhenkanal and Cuttack	22,363	50·38	874·8	4,374
14. Tikara—Aunil Project	Sambalpur and Dhenkanal	521	50·38	131·0	650
15. Samkoi Project	Keonjhar	127	50·38	11·7	59
16. Bheden Project	Sambalpur	701	58·14	238·0	1,190
		49,860·5		2,561·6	12,811

TABLE 15

PROPOSED TARGETS AND OUTLAY FOR THE AGRICULTURAL PROGRAMME, 1961-71

	Area Covered (Million acres)	*Additional Quantity* (Million tons)	*Investment Component* (Rs. crores)
1. *Irrigation*			
(a) Major and medium	2·5	0·47(f)	128·10
(b) Minor	1·0	0·20(f)	35·00
2. *Land Development*			
(a) Extension of area	0·8	0·14(f)	11·10
(b) Soil conservation	2·0	0·09(f)	4·24
(c) Afforestation of shifting cultivated areas	7·68	..	20·35
(d) Planting of catchment	0·5	..	1·33
3. *Manuring*			
(a) Fertilizers			
(i) Nitrogenous (0·4 million tons)	..	0·7(f)	..
(ii) Phosphatic (0·1 million tons)	..	0·1(f)	..
(b) Compost (20 Million tons)	..	0·5(f)	..
(c) Green manuring	5·0	0·6(f)	..
4. *Improved Seeds*	10·0	0·50(f)	0·28
5. *Better Techniques*	..	0·3(f)	..
6. *Crop Intensity*			
(a) Jute	0·5	1·87 (million bales)	
(b) Tobacco	0·05	0·00134	
(c) Oilseeds			
(i) Groundnut	0·3	0·134	..
(ii) Linseed	0·2	0·027	
(iii) Mustard	0·3	0·070	..
(d) Pulses	3·15	0·700(f)	
7. *Extension of area for high value crops*			
(a) Sugarcane	0·15	3·0	
8. *Agricultural Extension*	..	..	11·90
			212·30

f: Foodgrains

NOTE: (*a*) Of the expected additional production potential created under various heads, the following percentages are assumed to be allowed for foodgrains production—Irrigation and Soil Conservation 90, Reclamation 70, Compost 60, Fertilizers 50, Green Manuring and Improved Seeds 100. The balance will be accounted for by other crops.

(*b*) It is assumed that due to improved practices and better techniques, an additional production potential of 10 per cent is expected to be created under various schemes.

(*c*) Investment component is assumed to be the following percentage of total expenditure under each head—Irrigation 100 per cent, Reclamation Seeds 53 per cent, Better Techniques (including Soil Conservation) 53 per cent and Agriculture Extension 70 per cent.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

TABLE 16

ESTIMATED GROWTH OF AGRICULTURAL PRODUCTION

Product	*Unit*	*Estimated Output 1960-61*	*Additional Output 1961-71*		*Expected Output 1970-71*
			At Technically Feasible Level	*Expected (i.e. 60 % of Technically Feasible Level)*	
1. Foodgrains	Million tons	*4.00*	*4.30*	*2.58*	*6.58*
(*a*) Rice and other Cereals and Millets	-do-	3·70	3·60	2·16	5·86
(*b*) Pulses	-do-	0·30	0·70	0·42	0·72
2. Sugarcane	-do-	*1·00*	*3.00*	*1.80*	*2.80*
3. *Oilseeds*	-do-	*0.09*	*0.23*	*0.14*	*0.23*
4. Jute	Million bales	*0.265*	*0.75*	*0.45*	*0.715*

TABLE 17

LIVESTOCK IN ALL-INDIA AND ORISSA

Livestock	*All-India*		*Orissa*		
	Total Number (Thousands)	*Col. (2) as per cent of Total Livestock (India)*	*Total Number (in 1957)* (Thousands)	*Col. (4) as per cent of Total Livestock (Orissa)*	*Number of Col. (4) as per cent of Number in Col. (2)*
(1)	(2)	(3)	(4)	(5)	(6)
Cattle	158,863	51·73	8,220	67·79	6·17
Buffaloes	44,766	14·58	888	7·32	1·98
Sheep	38,666	12·59	1,117	9·21	2·89
Goats	56,628	18·44	1,694	13·96	2·99
Horses and Ponies	1,503	0·49	79	0·65	5·26
Other Livestock (Mules, Donkeys, Camels and Pigs)	6,675	2·17	130	1·07	1·95
TOTAL LIVESTOCK	307,083	100·00	12,128	100·00	3·95

SOURCE: For All-India: *Agricultural Statistics of Reorganised States.*
For Orissa: Directorate of Animal Husbandry, Government of Orissa.

TABLE 18

ADDITIONAL EMPLOYMENT POTENTIAL IN FOREST DEVELOPMENT

(During Third Plan period)

Sector	*Divisional Forest Officers Level*	*Forest Rangers*	*Deputy Forest Rangers*	*Foresters*	*Forest Guards*	*Upper Division Clerks*	*Lower Division Clerks*	*Malis*	*Unskilled Labour* (Man-days in hundred thousands)
1. Additional Employment (Extension of Forestry)	..	1	..	6	30	..	..	30	8·82
2. Economic Plantations	2	10	..	70	186	..	..	..	80·00
3. Land Utilization	1	6	..	26	9	..	..	..	..
4. Consolidation	..	..	..	60	60	13	13	..	3·30
5. Forest Resources Survey	1	5	20	..	28	..	..	..	8·24
6. Forest Working Plans	2	8	16	..	..	..	..	..	3·75
7. Rehabilitation	..	5	..	12	60	..	12	..	53·66
8. Grazing Facilities	..	..	1	4	14	..	..	..	3·76
9. Minor Forest Products	..	..	..	20	40	..	..	..	1·79
10. Tassar Development	..	..	..	..	..	..	..	..	0·80
11. Ramnofia Surpentina	..	..	..	..	..	..	..	..	0·96
12. Camphor	..	..	..	..	..	..	..	..	0·20
13. Communication	..	12	..	33	84	..	12	..	22·95
14. Building	..	..	..	..	..	..	..	..	41·37
15. Forest Survey	..	..	..	..	..	..	..	..	2·67
TOTAL	6	47	37	231	521	13	37	30	232·27

SOURCE: NCAER Estimate.

TABLE 19

MARINE FISHING VILLAGES, CRAFT, FISHERMEN AND LANDINGS

	Orissa	*India*	*Percentage of Col. 2 to Col. 3*
(1)	(2)	(3)	(4)
Number of Fishing Villages	115	1,734	6·7
Number of Fishing Craft	2,837	85,063	3·3
Number of Fishermen (engaged in fishing)	11,150	395,230	2·8
Average Landings[a] (metric tons)	7,635	816,705	0·9
Catch per Fishing Craft (in kgms)	2,690	9,550	28.0
Catch per Fisherman (in kgms)	684	2,060	33.0

[a] Average for 1956, 1957 and 1958.

TABLE 20

INCREASE IN OUTPUT AND INVESTMENT IN FISHERIES BETWEEN 1960-61 AND 1965-66

Fisheries	*Production* (Tons)		*Additional Output* (Tons)	*Investment* (Rs. lakhs)	*Percentage Increase in Output*
	1957-58	*1965-66*[a]			
(1)	(2)	(3)	(4)	(5)	(6)
I. *Marine*	*7,500*	*21,000*	*13,500*	*112*	*180*
(*a*) Coastal	7,500	16,000	8,500		
(*b*) Off-shore	..	5,000	5,000		
II. *Estuarine*	*9,000*	*12,000*	*3,000*	*15*	*33*
(*a*) Chilka Lake	4,000	4,000	..		
(*b*) Other Estuaries	5,000	8,000	3,000		
III. *Riverine*	*2,000*	*4,500*	*2,500*	*170*	*125*
IV. *Reservoirs and Culture*	*6,000*	*13,500*	*7,500*		
TOTAL	24,500	51,000	26,500	297	92

[a] For figures in these columns it has been assumed that production increase between 1957-58 and 1960-61 will not be significant as indicated in para 5.5 of Chapter 5.

TABLE 21

PROBABLE CHANGES IN THE UTILIZATION PATTERN OF FISH OUTPUT, 1961–71

	1957-58 (tons)	*1965-66* (tons)	*1970-71* (tons)	*Percentage Increase in 1970-71 over 1957-58*
(1)	(2)	(3)	(4)	(5)
Output	*24,500*	*51,000*	*100,000*	*308*
(*a*) Export	*4,000*	*9,000*[a]	*18,000*[c]	*400*
(*b*) Industrial Consumption	..	*3,000*[b]	*10,000*[d]	*230*[e]
(*c*) Available for human consumption	20,500	39,000	72,000	235
(*i*) Per capita annual consumption for the entire population[f]	2·9		8·0	150
(*ii*) Per capita annual consumption for the fish-eating population	4·2		11·0	150

[a] Of the additional catch of 'A' class marine fish of 3,400 tons, prawns would constitute about 1,000 tons. On the basis of present export and probable exploitation market demand in Calcutta and other out of State markets, it is anticipated that two-thirds of the prawns of about 8,100 tons of 'B' class fish would be exported. Of about 8,000 tons of 'B' class fish nearly one-fourth is expected to be exported. The total export in 1965-66 (including the current export) is thus likely to be 9,000 tons or roughly 18 per cent of the total output.

[b] Expected utilization of fish meal and oil industry.

[c] Exports would constitute the same proportion of total output as in 1965-66.

[d] Expansion of fish meal and oil and shark liver oil industry anticipated for the period 1966–71 will be much higher than in the previous five year period. The figure does not include fish earning.

[e] Over 1965-66.

[f] Population for 1970-71; according to NCAER projections fish-eating population takes at the rate of 70 per cent of the total.

TABLE 22

MINERALS OF ORISSA : DEPOSITS AND OCCURRENCES

Minerals	*Location (Districts)*	*Composition of Ores (Percentage Ranges)*			*Proved and Indicated Reserves* (Million tons)		*Possible (inferred) Reserves* (Million tons)		*Remarks*
		Fe	P	S	*Orissa*	*All-India*	*Orissa*	*All-India*	
1. IRON ORES	Keonjhar[a]	2·95 to 4·92	0·05 to 0·088	0·002 to 0·030	988		8,000[b]		[a] *Iron Ores in India* by M. S. Krishnan. The figures shown for reserves refer largely to Hamatite Ores.
	Sundargarh[a] (Bonai)	About 60·0	0·04 to 0·1	0·02	648				
	Mayurbhanj[a]	61·46 to 67·74	0·023 to 0·075	0·012 to 0·036	60				[b] Bulletin No. 9—*Iron Ore, Iron & Steel* by M. S. Krishnan. The figure of 8,000 million tons includes deposits in Singhbhum district in Bihar.
	Cuttack[c]	66·60 to 69·38	..	..	31		130[d]		[c] Geological Survey of India: *The Economic Geology of Orissa.*
	Koraput[c]	60·50 to 62·70	0·23 to 0·33	..	10				[d] *Sukinda-Paradip Project* by Dr. H. B. Mohanty.
	Sambalpur[c]	55·0 to 60·0	0·31	..	50				[e] United Nations: *Survey of World Iron Ore Resources, 1955.* (The figure of 17,630)
	TOTAL				1,787	5,316	8,130	17,630[e]	

(Contd. overleaf)

TABLE 22 (*Contd.*)

MINERALS OF ORISSA: DEPOSITS AND OCCURRENCES

Minerals	*Location (Districts)*	*Composition of Ores (Percentage Ranges)*				*Proved and Indicated Reserves* (Million tons)		*Possible (inferred) Reserves* (Million tons)		*Remarks*
						Orissa	*All-India*	*Orissa*	*All-India*	
		Mn	Fe	SiO_2	P					
2. MANGANESE	Sundargarh[a]	36·15 to 59·00	1·12 to 11·22	0·39 to 8·26	0·011 to 0·18					[a] *India's Mineral Wealth* by J. Coggin Brown and A. K. Dey. [b] Geological Survey of India: *Indian Minerals*, Vol. XI, No. 3. [c] These figures are not available but it is generally accepted that the possible reserves are several times the present estimated reserves.
	Keonjhar[a]	38·00 to 58·85	0·45 to 14·00	0·78 to 6·00	0·075 to 0·15					
	Koraput[b] (Kutingi)	44·34 to 55·42	1·12 to 5·02	..	Nil to 0·02					
	Bolangir[b] (Patna)	38·00 to 54·15	3·00 to 18·00	Nil to 8·60	0·036 to 0·103					
	TOTAL					10	125	..[c]	..[c]	
		Cao	MgO	R_2O_3	Insol					
3. LIMESTONE	Sundargarh[a] (Birmitrapur) and other areas	45·90 to 50·55	..	About 3 to 4	..	25 to 30		300[b]		[a] *India's Mineral Wealth* by Brown and Dey. [b] Bulletin No. 12 of G.S.I., series A—*Economic Geology*. Of the total reserves it is estimated that 21 million tons are first grade material and suitable for metallurgical purpose and about 69 million tons are second grade materials suitable for lime burning. [c] This total has not been stated as the reserves of Koraput are not known definitely. [d] The possible reserves in the country stated in *India's Mineral Wealth* amount to about 13,000 million tons (without Bihar for which no figures have been furnished).
	Koraput[b]	25·35	19·18	0·20	14·72					
	Sambalpur[b]	21·28 to 49·84	15·24 to 20·04	.. ..	.. ..	23				
	TOTAL					..[c]	..[d]	..[c]	About 13,000[d]	

			CaO	MgO	SiO_2	Fe_2O_3					
4.	DOLOMITE	Sundargarh[a] (Birmitrapur)	30·58	19·55	2·95	0·80	84[a]		250[a]		[a] *India's Mineral Wealth* by Brown and Dey.
		Sambalpur[a] (Koraput)	29·68	20·41	3·40	0·78	5[a]				[b] The extent of proved and possible reserves in the country is not known.
						TOTAL	93	..[b]	250	..[b]	
			Moisture	*Volatile*	*Fixed Carbon*	*Ash*					
5.	COAL	Dhenkanal[a] (Talcher)	5·88 to 6·20	29·34 to 34·73	43·86 to 47·35	11·72 to 20·92	100[a]	N.A.	N.A.		[a] G.S.I.: *India's Coal Resources, 1957.*
		Sambalpur[a] (Rampur Hingir)	4·66 to 12·22	28·44 to 34·73	33·34 to 51·64	12·80 to 25·00	700[a]	N.A.	1845[a]		[b] The reserve figures refer only to Gondwana coals.
		TOTAL					800	38,116[ab]	74,925[ab]		
			Cr_2O_3	SiO_2	Al_2O_3	FeO					
6.	CHROMITE	Keonjhar[a]	43·86 to 56·64	6·18 to 20·40	1·53 to 5·24	12·99 to 18·12	0·20				[a] Bulletin No. 7—Chromite, issued by G.S.I.
		Cuttack[a]	..	..	..	..	..				[b] *India's Mineral Wealth* by Brown and Dey.
		Dhenkanal[b]	..	..	..	..	0·120				
						TOTAL				1·53[a]	
			Al_2O_3	Si	Fe						
7.	BAUXITE	Sambalpur[a] Kalahandi[a] Koraput[b]	27·34 to 60·49	2·06 to 19·80	7·11 to 42·66	.. ..	0·85		3·00[b]		[a] G.S.I.: *Economic Geology of Orissa.* [b] This is a figure estimated by Mr. S. C. Chakrabarthy of G.S.I. but there are no published data confirming this.
						TOTAL	0·85	25·77[c]	3·00	250·00[d]	[c] *India's Mineral Wealth* by Brown and Dey. [d] *Mineral Production in India, 1957.*

(Contd. overleaf)

TABLE 22 (*Contd.*)

MINERALS OF ORISSA: DEPOSITS AND OCCURRENCES

	Minerals	*Location (Districts)*	*Composition of Ores (Percentage Ranges)*				*Proved and Indicated Reserves (Million tons)*		*Possible (inferred) Reserves (Million tons)*		*Remarks*
							Orissa	*All-India*	*Orissa*	*All-India*	
8.	CHINA CLAY	Keonjhar[a]	Not available								[a] *India's Mineral Wealth* by Brown and Dey. [b] G.S.I.: *Economic Geology of Orissa.* [c] This total refers only to the reserves of Bihar and Madras as given by Brown and Dey. Reserves of other States are not known. The Orissa reserves are reported to be of a good quality.
		Sundargarh[a]							..	..	
		Sambalpur[a]									
		Mayurbhanj[a]									
		Koraput[b]						26·95[c]	..	..	
			Silica	*Alumina*	*Iron Oxide*	*Lime*					
9.	FIRE CLAY	Sambalpur[a] Dhenkanal, Puri	50·34	34·30	1·00	Traces	N.A.	N.A.	N.A.	N.A.	[a] *India's Mineral Wealth* by Brown and Dey.
			TiO_2	V_2O_5	SiO_2	Fe					
10.	VANADIUM	Mayurbhanj[a]	14·00	1·26	2·30	82·44	9 to 10[c]				[b] Non-ferrous Metal industry in India—CSIR—1957. [c] This figure also includes the reserves of Singhbhum district in Bihar. [d] *India's Mineral Wealth* by Brown and Dey.
		Keonjhar[b]					0·05[b]				
11.	GRAPHITE	Kalahandi[a] Sambalpur[a] Koraput[a] Bolangir[a] Cuttack[b]	*Fixed Carbon* 55 to 60				N.A.	N.A.	N.A.	N.A.	[a] *India's Mineral Wealth* by Brown and Dey. Occurrences have been reported in these districts but the extent of the reserves is not known. No figures are available for the country's reserves. [b] G.S.I.: *Economic Geology of Orissa.*

12.	KYANITE	Mayurbhanj	The occurrence of these minerals has been reported in the districts mentioned but the quality and the extent of the reserves are not known.
13.	TITANIUM	Cuttack Puri	
14.	GOLD	Koraput Cuttack	
15.	MICA	Sambalpur Balasore Koraput	
16.	DIAMOND	Sambalpur	
17.	OCHRES	Koraput Puri	
18.	ILMENITE	Sambalpur	
19.	LEAD	Sambalpur	
20.	FELDSPAR	Sambalpur	
21.	BERYL	Sambalpur	
22.	GARNET	Sambalpur	
23.	STEATITE	Cuttack Koraput	

TABLE 23

NUMBER OF MINES IN ORISSA (1950–57)

Mineral	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
1. Iron Ore	32	32	32	32	32	32	32	32
2. Coal	6	6	6	6	6	6	6	6
3. Manganese	82	82	82	82	82	82	87	89
4. Graphite	5	5	5	5	5	5	3	8
5. Limestone	6	6	6	6	6	6	6	6
6. Dolomite	4	4	4	4	4	4	..	..
7. Kyanite	1	1	1	1	1	1	1	1
8. Asbestos and Vanadium	2	2	2	2	2	2	..	..
9. China Clay	5	5	5	5	5	5	6	5
10. Fire Clay	1	1	1	1	1	1	3	3
11. Chromite	4	4	4	4	4	4	6	6
12. Soapstone	3	3	3	3	3	3	..	1

CSL

TABLE 24

MINERAL PRODUCTION IN ORISSA (1950–57)

(Output in tons)

Name of Mineral	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
1. Iron Ore	1,527,301	1,822,747	1,724,640	1,665,239	1,793,632	1,881,537	1,769,831	2,054,281
2. Coal	375,850	482,111	459,481	489,982	525,403	551,968	603,131	532,290
3. Manganese	151,007	252,221	308,765	431,544	346,767	401,171	366,932	382,307
4. Limestone	706,700[a]	622,021[a]	1,126,382[a]	1,188,267[a]	1,071,999	1,101,204	1,049,344	1,362,599
5. Dolomite	48,146[a]	56,046[a]	49,668[a]	62,240	126,273	72,376	94,858	136,117
6. Chromite	2,259	1,598	16,901	31,380	14,011	70,457	45,734	68,970
7. Kyanite	..	63	1,169	..	167	224	223[a]	..
8. China Clay	3,111	3,640	4,424	4,249	4,957	3,878	11,173	17,466
9. Fire Clay	11,065	14,881	18,675	18,680	10,496	11,380	12,224	19,034
10. Salt	32,976	37,664	37,121	54,138	26,168	32,299	50,521	44,398
11. Graphite[a]	632	747	1,164	381	804	917	631	976
12. Steatite	184	55	577	70	..	65	18	129
13. Asbestos[a]	56	..	..	..	..	..	..	..
14. Kaolin	..	..	..	..	..	..	..	1,735

[a] *Quarterly Bulletin of Statistics*, Government of Orissa.
SOURCE: *Mineral Production in India*, 1957.

TABLE 25

OUTPUT OF MINERALS AND LABOUR PRODUCTIVITY (1956)

State	*Employment in Mines covered by the Act*	*Output* (tons)	*Value* (Rs.)	*Output per Worker* (tons)	*Value of Output per Worker* (Rs.)
A. Coal					
Orissa	*6,910*	*602,813*	*1,07,46,880*	*87·5*	*1,550*
Madhya Pradesh	38,525	4,833,000	7,93,82,336	125	2,050
Bihar	182,194	20,083,000	31,65,26,000	114	1,740
West Bengal	98,943	11,188,283	18,70,67,248	114	1,920
All-India	352,429	39,280,000	65,07,92,699	111	1,860
B. Iron Ore					
Orissa	*13,690*	*1,801,470*	*1,24,32,467*	*131*	*910*
Bihar	13,692	1,849,217	1,37,41,716	135	1,010
Andhra Pradesh	4,290	396,574	54,11,605	92	1,260
Mysore	2,129	380,884	14,06,872	181	665
All-India	37,301	4,750,456	3,78,19,326	127	1,010
C. Manganese					
Orissa	*17,701*	*353,618*	*1,79,67,826*	*20*	*1,010*
Madhya Pradesh	31,773	441,744	4,35,00,931	13·9	1,370
Bihar	1,036	46,482	8,52,286	44·0	820
Andhra	11,307	214,826	74,33,401	18·9	655
Mysore	9,685	147,177	93,01,946	15·3	960
Bombay	27,938	570,991	5,34,72,340	20·5	1,920
All-India	109,948	1,780,837	13,27,41,212	16·3	1,220

SOURCE: Annual Report of the Chief Inspector of Mines (1957).

TABLE 26

MINERAL PRODUCTION IN ORISSA: OUTPUT AND VALUE; ACTUALS FOR 1951 AND 1957 AND ESTIMATES FOR 1961 AND 1971

(Based on 1957 average prices in Orissa)

Name of Mineral	*1951*			*1957*			*1961*		*1971*	
	Output (Thousand tons)	*Gross Value* (Rs. lakhs)	*Net Value* (Rs. lakhs)	*Output* (Thousand tons)	*Gross Value* (Rs. lakhs)	*Net Value* (Rs. lakhs)	*Output* (Million tons)	*Net Value* (Rs. lakhs)	*Output* (Million tons)	*Net Value* (Rs. lakhs)
1. Iron Ore	1,823	173·16	161·04	2,054	195·16	181·50	4·00	353	26·00	22,97
2. Coal	482	97·87	85·15	532	108·05	94·00	0·60	106	3·90	6,89
3. Manganese	252	150·32	139·80	382	227·85	211·90	0·40	221	0·70	3,88
4. Limestone	622[a]	45·41	42·43	1,363	99·47	92·51	2·00	136	5·50	3,73
5. Dolomite	56[a]	8·12	7·55	136	19·74	18·36	0·22	30	2·90	3,92
6. Chromite	2	0·55	0·51	69	23·66	22·00	0·08	26	0·10	32
7. China Clay	4	0·59	0·55	17	2·85	2·65	0·02	3	0·04	6
8. Fire Clay	15	2·53	2·35	19	3·24	3·01	0·03	5	0·10	17
9. Salt	37	9·74	9·06	44	11·63	10·82	0·05	12	0·07	16
10. Graphite	01[a]	1·58	1·47	01	2·57	2·39	0·01	6	0·02	12
11. Kyanite	01	1·47	1·37	..	..	..				
12. Bauxite	Nil	..	..	Nil	..	..				
13. Steatite	01	0·02	·02	01	0·06	0·05				
14. Asbestos	01[a]	0·42	0·39	Nil	..	..				
15. Kaolin	Nil	..	..	2[a]	0·97	0·90				
		491·78	451·69		695·25	640·09		898		42,22

[a] *Quarterly Bulletin of Statistics*, Government of Orissa.
01: Under one thousand tons
SOURCE: *Mineral Production in India*, 1957.

TABLE 27

RELATIVE PRODUCTION OF IRON ORES BY VARIOUS STATES (1950–57)

(Percentages)

State	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
Andhra	..	..	0·41	1·98	6·60	8·25	8·92	5·32
Bihar	46·80	49·15	50·09	49·50	45·15	41·27	39·30	39·00
Bombay	0·35	0·04	0·05	0·19	0·39	1·06	2·72	2·45
Madhya Pradesh	..	0·01	0·25	0·11	..	0·14	0·69	0·70
Mysore	2·25	1·80	5·00	4·42	5·70	7·70	7·85	11·30
Orissa	*50·60*	*50·00*	*44·29*	*43·00*	*41·78*	*40·10*	*37·60*	*40·43*
Others	..	..	..	0·80	0·38	1·48	2·92	1·85
TOTAL	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

SOURCE: *Mineral Production in India*, 1957.

TABLE 28

ORISSA'S SHARE IN ALL-INDIA MINERAL PRODUCTION (1950–57)

Mineral	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
Iron Ore	50·6	50·0	44·3	43·0	41·8	40·1	37·6	40·4
Coal	1·2	1·4	1·3	1·4	1·4	1·4	1·5	1·2
Manganese	17·1	19·5	21·1	22·7	24·5	25·3	21·1	23·1
Limestone	31·1[a]	21·3[a]	42·6	27·9	17·4	15·0	12·7	14·5
Dolomite	90·8[a]	N.A.	N.A.	N.A.	91·7	80·4	96·0	96·6
Chromite	13·5	9·6	17·9	48·5	30·8	78·9	86·8	87·8
Kyanite	..	1·5	4·4	..	0·4	1·9	..	..
China Clay	5·8	5·3	5·2	4·5	3·4	3·3	7·2	9·7
Fire Clay	9·0	13·2	15·7	14·0	11·2	13·0	8·8	11·6
Salt	1·3	1·4	1·4	1·7	1·0	1·1	1·6	1·1
Steatite	0·7	0·2	2·8	0·2	..	0·2	0·1	0·3

[a] *Quarterly Bulletin of Statistics*, Government of Orissa (For Orissa Output).
N.A.=Not Available.
SOURCE: *Mineral Production in India, 1957.*

CSL

TABLE 29

MINERAL DEVELOPMENT IN ORISSA : ESTIMATED LEVELS OF ADDITIONAL (ANNUAL) OUTPUT, EMPLOYMENT AND INVESTMENT (1961-71)

Mineral	*Location*	*Nature of Ownership*	*Principal Sources of Demand*	*Additional Output Required* (Million tons)	*Net Value of Additional Output at 1957 prices* (Million tons)	*Fixed Investment Required* (Rs. lakhs)	*Power Required* (KWTs)	*Additional Manpower Requirements*			
								Managerial and Clerical	*Skilled and Semi-skilled*	*Un-skilled*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Mineral Ore	Sundargarh Keonjhar Mayurbhanj	Public Private	Rourkela, New Steel Plant, Foundry Grade Pig Iron, Exports to other States, and other countries	22·0	194·4	40,00	4,000	5,000	45,000	90,000	140,000
(Steam) Coal	Talcher Sambalpur	Private	Railways; Iron and Steel (State), Cotton, Cement, Paper and other Industries. Brick and lime burning, electricity supply, and exports to other States	3·3	58·3	15,00	10,000	1,500	13,500	15,000	30,000
Manganese	Bonai Keonjhar Gangpur	,,	Ferro-Manganese Industry Beneficiation and Exports	0·3	16·7	170	2,000	200	3,800	6,000	10,000
Limestone	Purnapani	,,	Lime burning, Cement, Steel, Ferro-manganese, Refractory, Paper and Chemical Industries, Exports to (Steel Plants in) other States	3·5	23·7	15	1,500	500	4,500	9,000	14,000
Dolomite	Sundargarh Sambalpur	,,	Steel Industry in the State and other States	2·68	36·2	12	1,000	500	2,500	7,000	10,000
China Clay	Mayurbhanj Sambalpur	,,	Ceramics and Potteries	0·02	0·3	2	500	20	130	450	600
Fire Clay	Sambalpur Dhenkanal	,,	Refractory Industry	0·07	1·2	10	700	50	250	700	1,000

CSL

8

Salt	Cuttack, Puri Ganjam	,,	General Consumption and Chemical Industries	0·02	0·5	1	300	25	125	350	500
Chromite	Keonjhar	,,	Ferro-Chrome Industry	0·02	0·6	0·1	500	50	350	500	900
Bauxite	Kalahandi Sambalpur	,,	Refractory Industry	0·025	0·2	0·2	500	20	280	400	700
Quartzite	Sambalpur	,,	Ferro-silicon and Ceramic Industries	0·05	0·3	0·4	1,000	50	550	800	1,400
Glass Sand	Kalahandi	,,	Glass industry	0·06	0·5	0·4	1,000	50	650	1,000	1,700
Graphite Kyanite Steatite Asbestos Kaolin				0·01	0·6	0·2	500	25	75	500	600
					333·5	5711·3	23,500	7,990	71,710	131,700	211,400

TABLE 30

FACTORY EMPLOYMENT IN SELECTED STATES OF INDIA

	Number of Factory Workers (million)	*Number of Factory Workers per 1000 Population*[a]
All-India	2·882	7·4
Andhra Pradesh	0·167	4·9
Bihar	0·176	4·2
Bombay	0·998	18·8
Madhya Pradesh	0·098	3·6
Madras	0·300	9·3
Orissa	*0·022*	*1·4*
West Bengal	0·653	22·9

[a] Based on NCAER Population Projections.

SOURCE: Chief Inspector of Factories, 1956.

TABLE 31

DISTRIBUTION OF EMPLOYMENT BY INDUSTRIES IN ORISSA AND ALL-INDIA (1957)

Category of Industry	*Orissa*[a] *Percentage of Total*	*India*[b] *Percentage of Total*
1. Agriculture-based	39·8	60·1
2. Forest-based	25·8	2·7
3. Mineral-based	12·5	7·3
4. Metal-based	11·7	15·5
5. Chemicals	0·6	3·5
6. Livestock-based	0·5	1·5
7. Miscellaneous	8·3	9·2

[a] Chief Inspector of Factories, Government of Orissa.

[b] *Indian Labour Gazette*. Data do not include figures for Kerala, Rajasthan and Union Territories except Delhi.

TABLE 32

DISTRIBUTION OF EMPLOYMENT BY INDUSTRIES (1956-57 AND 1960-61)

Category	*1956-57* *Percentage of Total*	*1960-61* *Percentage of Total*
1. Agriculture-based	39·8	37·0
2. Forest-based	25·8	13·8
3. Mineral-based	12·5	31·0
4. Metal-based	11·7	12·2
5. Chemicals	0·6	0·4
6. Livestock-based	0·5	0·3
7. Miscellaneous	9·1	5·3
	100·0	100·0

TABLE 33

ESTIMATED INVESTMENT, OUTPUT AND EMPLOYMENT OF THE MORE SPECIFIC INDUSTRIES SUGGESTED (1970-71)

Category of Industry	*Investment* (Rs. crores)	*Net Output* (Rs. crores)	*Employment*
Mineral-based	487·75	109·10	37,760
Metal-based	15·10	15·80	25,150
Chemicals	26·90	13·60	15,600
Forest-based	8·90	3·20	1,740
Others	11·350	4·00	10,240
TOTAL	550·00	145·70	90,490

TABLE 34

ADDITIONAL INVESTMENT, VALUE OF NET OUTPUT, EMPLOYMENT AND POWER REQUIREMENT FOR CATEGORIES OF SPECIFIC INDUSTRIES SUGGESTED FOR THE THIRD PLAN

Industries	*Investment*			*Value of Net Output*	*Employment*	*Power* (kW)
	Public (Rs. crores)	*Private* (Rs. crores)	*Total* (Rs. crores)	(Rs. crores)		
Mineral-based	80·00	18·75	98·75	39·12	14,960	157,500
Metal-based	..	7·80	7·80	8·815	10,575	9,875
Chemicals	..	21·60	21·60	11·15	10,300	38,525
Forest-based	..	4·30	4·30	1·28	945	38,250
TOTAL	80·00	52·45	132·45	60·365	36,780	244,150

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL

TABLE 35

ADDITIONAL INVESTMENT, VALUE OF NET OUTPUT, EMPLOYMENT AND POWER REQUIREMENT FOR CATEGORIES OF INDUSTRIES SUGGESTED FOR THE FOURTH PLAN

Industries	*Investment*			*Value of Net Output* (Rs. crores)	*Employ-ment*	*Power* (kW)
	Public (Rs. crores)	*Private* (Rs. crores)	*Total* (Rs. crores)			
Mineral-based	370	19·0	389·0	69·95	22,800	385,000
Metal-based	..	7·30	7·30	7·01	14,575	8,125
Chemicals	..	5·30	5·30	2·47	5,300	1,400
Forest-based	..	4·55	4·55	1·91	795	39,000
TOTAL	370	36·15	406·15	81·34	43,470	433,525

TABLE 36

CAPACITY, INVESTMENT, VALUE OF NET OUTPUT, EMPLOYMENT AND POWER REQUIREMENT FOR SPECIFIC INDUSTRIES SUGGESTED FOR THE THIRD PLAN PERIOD

Industries (1)	*Capacity* (2)	*Investment* (Rs. crores) (3)	*Value of Net Output* (Rs. crores) (4)	*Employment* (5)	*Power* (kW) (6)
Mineral-based	(Million tons)				
1. Pig Iron	0·25	7·00	2·50	3,400	5,000
2. Steel					
(*a*) Production to capacity installed at Rourkela	..	..	12·00	4,000	..
(*b*) Expansion of Rourkela Plant	0·8	80·00	19·20	6,000	80,000
3. Aluminium (Expansion)	0·01	5·00	1·05	800	25,000
4. Ferro-Manganese (Expansion)	0·07	5·00	3·10	560	35,000
5. Ferro-Chrome	0·01	0·70	0·69	80	5,000
6. Ferro-Silicon	0·15	1·05	0·58	120	7,500
SUB-TOTAL		98·75	39·12	14,960	157,500

(Contd. overleaf)

TABLE 36 *(Contd.)*

Industries	*Capacity*	*Investment* (Rs. crores)	*Value of Net Output* (Rs. crores)	*Employment*	*Power* (kW)
(1)	(2)	(3)	(4)	(5)	(6)
Metal-based	*(Tons)*				
1. Steel Pipes and Tubes (Expansion) (New Plant)	30,000	2·50	26·0	325	1,875
2. Structural Fabrication (Expansion)	15,000	1·75	10·0	1,500	1,250
3. Bolts, Nuts and Rivets (Multiple Shifts)	1,200	0·50	0·25	250	
4. C. I. Pipes (Multiple Shifts)	6,000		0·29	250	750
5. Sewing Machines (Multiple Shifts)	6,000 (Nos.)		0·07	100	
6. Aluminium Rolling	20,000	2·50	2·50	2,000	2,500
7. A.C.S.R. (Multiple Shifts)	1,800	0·05	0·70	150	500
8. Industrial Machinery (Multiple Shifts)	6,000	0·50	1·40	6,000	3,000
SUB-TOTAL		7·80	8·81	10,575	9,875
Chemicals					
1. Refractories (Expansion and New Unit)	100,000	2·00	1·10	2,000	200
2. H. T. Insulators	2,400	0·30	0·23	250	
3. Sanitaryware	5,000	0·50		500	
4. Tiles and Stoneware	5,000	0·20		250	925
5. Domesticware, L. T. Insulators, etc.	2,000	0·20		200	
6. Glass (Expansion)	66,000	0·80	0·20	1,000	4,000
7. Styrene	10,000	1·50	0·30	500	15,000
8. Polystyrene	5,000	·60	0·70	100	250
9. Soda Ash-cum-Ammonium Chloride	14,300	1·50	0·35		800
or Ammonium Sulphate	19,000	3·00	or 0·27		
10. Nitro-limestone	580,000	12·00	7·00	5,000	10,000
11. Super-phosphate	50,000	0·35	0·34	300	500
12. Sulphuric Acid	24,700	0·15	0·13	50	50
13. Caustic Soda	16,500	1·50	0·80	150	6,800
SUB-TOTAL		21·60	11·15	10,300	38,525
Forest-based					
1. Paper	16,500	3·75	1·10	385	37,500
2. Paper Board	6,000	0·55	0·18	560	750
SUB-TOTAL		4·30	1·28	945	38,250
GRAND TOTAL		132·45	60·36	36,780	244,150

TABLE 37

CAPACITY, INVESTMENT, VALUE OF OUTPUT, EMPLOYMENT AND POWER REQUIREMENT FOR INDUSTRIES SUGGESTED FOR THE FOURTH PLAN PERIOD

Industries	*Capacity*	*Investment* (Rs. crores)	*Value of Net Output* (Rs. crores)	*Employment*	*Power* (kW)
(1)	(2)	(3)	(4)	(5)	(6)
Mineral-based	(Million tons)				
1. Steel					
(*a*) Expansion of Rourkela Plant	0·70	70·0	18·80	5,000	60,000
(*b*) New Plant	2·00	300·0	48·00	16,000	250,000
2. Aluminium					
(*a*) Expansion	0·01	5·0	1·05	800	25,000
(*b*) New Plant	0·02	14·0	2·10	1,000	50,000
SUB-TOTAL		389·0	69·95	22,800	385,000
Metal-based	(Tons)				
1. Steel Pipes and Tubes	30,000	2·50	2·60	325	1,875
2. Structural Fabrication	15,000	1·75	1·00	1,500	1,250
3. Bolts, Nuts and Rivets (Multiple Shifts)	1,200	0·50	0·25	250	750
4. C. I. Pipes (Multiple Shifts)	6,000		0·29	250	
5. Sewing Machines (Multiple Shifts)	6,000 Nos.		0·075	100	
6. A.C.S.R.	1,800	0·05	0·70	150	250
7. Industrial Machinery	18,000	2·50	2·10	12,000	4,000
SUB-TOTAL		7·30	7·015	14,575	8,125
Chemicals					
1. Refractories	200,000	4·00	2·20	4,000	400
2. H. T. Insulators	2,400	0·30	0·27	250	1,000
3. Sanitaryware	5,000	0·50		500	
4. Tiles and Stoneware	5,000	0·20		250	
5. Domesticware	3,000	0·30		300	
SUB-TOTAL		5·30	2·47	5,300	1,400
Forest-based					
1. Paper	16,500	3·75	1·10	385	37,500
2. Particle-based	4,500	0·20	0·13	205	300
3. Hard Board	7,500	0·60	0·68	205	1,200
SUB-TOTAL		4·55	1·91	795	39,000
GRAND TOTAL		406·15	81·345	43,470	433,525

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

TABLE 38

LIST OF METAL-BASED INDUSTRIAL UNITS LICENSED (1951–59)

Licensed	*Annual Capacity*
1. Steel Tubes	30,000 tons
2. Refrigerators	2,400 nos.
3. Re-rolling	5,472 tons
4. Foundry	4,500 ,,
5. C. I. Pans and Rain Water Pipes	3,000 ,,
6. Bolts and Nuts	2,400 ,,
7. Chilled Iron Shot and Grits and Steel Castings	Chilled Iron & shots 480 tons of Steel castings
8. Galvanized Black Steel Pipes	40,000 tons
9. Cycle Chains	232,500 nos.
10. Structural Steel	
Bridge and Girders	12,000 tons
Storage Tanks	8,000 ,,
11. Steel Castings	4,800 ,,
12. Ferro-Chrome	15,000 ,,
13. A.C.S.R.	3,600 ,, of rods
	3,600 ,, of cables
14. Aluminium Ingots	20,000 ,,
15. Cast Iron Spun Pipes	24,000 ,,
16. Cast Iron Casting	33,600 ,,
17. Electrilut Absorption Type of Cooling Units	4,800 ,,
18. Industrial Machinery	12,000 ,,
19. Steel Billets	600 ,,
20. Structural Transmission Towers	2,400 ,,
21. Pig Iron	15,000 ,,
22. Tubular Steel Structurals including Roofing Structurals	1,200 ,,
23. Steel Buckets	3,496,180 nos.
Under Consideration for Licensing	
1. Welded Steel Tubes	48,000 ,,
2. Welded Steel Pipes 27″ to 72″	15,000 ,,
3. Pig Iron (Low Shaft Furnace)	75,000 ,,
4. Steel Castings	2,160 ,,
5. Double-Edged Spanners	
6. Ferro-Silicon	19,200 ,,
7. Ferro-Chrome	5,760 ,,

CSL

TABLE 39

POSITIVE AND PROBABLE INVESTMENT IN SUGGESTED (LARGE SCALE) INDUSTRIES (1961–71)

District	*Positive Investment* (Rs. crores)	*Probable Investment* (Rs. crores)	*Total*
1. Balasore	1·75	..	1·75
2. Cuttack	5·00	22·10	27·10
3. Dhenkanal	2·50	..	2·50
4. Keonjhar	7·00	6·90	13·90
5. Koraput	5·00	14·90	19·90
6. Mayurbhanj	1·00	..	1·00
7. Puri	1·00	..	1·00
8. Sambalpur	10·10	11·10	21·20
9. Ganjam	..	6·60	6·60
10. Bolangir	..	0·90	0·90
11. Sundargarh	30·00	..	30·00

TABLE 40

INVESTMENT IN THE SUGGESTED SMALL FACTORY PLANTS BY LOCATION

District	*Investment* (Rs. lakhs)
Balasore	29·0
Bolangir	19·5
Cuttack	32·5
Dhenkanal	07·5
Ganjam	29·5
Kalahandi	04·0
Keonjhar	19·5
Koraput	15·25
Mayurbhanj	11·5
Phulbani	03·0
Puri	40·25
Sambalpur	23·25
Sundargarh	24·50
	259·25
Location not known	6·00
TOTAL	265·25

TABLE 41

INSTALLED CAPACITY AND POWER GENERATION IN PUBLIC ELECTRIC UTILITIES AND IN INDUSTRY-OWNED PLANT (1959-60)

	Hydro	*Steam*	*Oil*	*Total*
Installed Capacity (Megawatts)				
1. Total	123·0	N.A.	N.A.	229·300
1.1 Public Utilities	123·0	5·78	7·10	135·88
1.2 Industry-owned Plant	Nil	N.A.	N.A.	93·42
Annual Generation (Million kWh)				
2. Total	493·61	N.A.	N.A.	648·207
2.1 Public Utilities	493·61	1·12	7·00	501·73
2.2 Industry-owned Plant	Nil	N.A.	N.A.	146·48

N.A. = Not Available.
Source: "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), Central Water and Power Commission.

TABLE 42

INSTALLED CAPACITY OF PUBLIC ELECTRICITY UNDERTAKINGS (1950–60)

(Public Utilities only)

	Orissa (kW)				*All-India Total* (kW)	*Orissa as Per cent of All-India*
Year	*Diesel*	*Steam*	*Hydro*	*Total*		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1950	3,835	776	5	4,616	1,712,515	0·27
1951	4,079	776	5	4,860	1,835,426	0·26
1952	4,339	3,776	5	8,180	2,061,755	0·40
1953	4,523	5,776	5	10,304	2,305,190	0·45
1954	4,925	3,026	5	7,956	2,493,906	0·32
1955	5,072	5,776	5	10,853	2,694,817	0·40
1956	3,991	5,776	34,005	33,772	2,886,141	1·17
March						
1958	4,060	5,776	85,505	95,341	3,223,111	2·97
1959	5,445	5,776	123,005	134,226	3,511,536	3.82
1960	7,101	5,776	123,005	135,882	3,873,166	3·51

Note: (1) At the end of the calendar year for 1950 to 1956.
(2) At the end of the calendar year March 1958–1960.
Source: "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), Central Water and Power Commission.

CSL

TABLE 43

ELECTRICITY GENERATED (1950 to 1959-60)

(Million kWh)

Year[a]	*Orissa*	*All-India*	*Orissa as Per cent of All-India*
1950	5·693	5,106	0·11
1951	6·811	5,856	0·12
1952	8·263	6,120	0·14
1953	9·041	6,697	0·14
1954	11·813	7,521	0·16
1955	16·515	8,592	0·19
1956	21·145	9,662	0·21
1957-58	93·220	11,369	0·82
1958-59	288·730	12,994	2·22
1959-60	501·732	14,992	3·33

[a] Calendar year except where stated otherwise.

SOURCE: "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), Central Water and Power Commission.

TABLE 44

PATTERN OF POWER GENERATION (1955 to 1959-60)

(Public Utilities only)

(Million kWh)

Year	*Total*	*Diesel*	*Steam*	*Hydro*	*Percentages*			
					Total	*Diesel*	*Steam*	*Hydro*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1955	16·515	3·249	13·254	0·012	100·00	19·67	80·26	0·07
1956	21·145	3·517	17·617	0·011	100·00	16·63	83·32	0·05
1957-58	93·220	3·724	19·495	70·001	100·00	4·00	20·91	75·09
1958-59	233·720	4·239	0·441	284·050	100·00	1·47	0·15	98·38
1959-60	501·732	6·998	1·125	493·609	100·00	1·39	0·22	98·39

SOURCE: "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), Central Water and Power Commission.

CSL

TABLE 45

SALE OF ELECTRICITY FROM PUBLIC UTILITY UNDERTAKINGS (1951 to 1959-60)

(Million kWh)

Year	*Domestic Light and Power*	*Commercial Light and Power*	*Industry*	*Public Lighting*	*Irrigation*	*Water Works and Sewage Pumping*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1951	2·256	1·408	1·117	0·243	..	0·101	5·125
1952	2·254	1·878	1·279	0·316	..	0·109	6·026
1953	2·731	1·715	2·213	0·363	..	0·161	7·183
1954	2·951	1·572	2·741	0·418	0·001	0·589	8·272
1955	3·474	1·848	4·788	0·485	0·218	0·634	11·447
1956	4·023	1·938	7·578	0·614	..	1·049	15·201
1957-58	12·189	4·992	44·671	0·714	..	0·731	63·297
1958-59	14·470	6·271	240·450	0·894	..	1·516	263·601
1959-60	16·806	7·229	426·481	1·193	0·672	3·091	455·482

SOURCE: "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), CWPC.

TABLE 46

PATTERN OF POWER SALES IN PUBLIC UTILITY UNDERTAKINGS (1951 to 1959-60)

(Percentage distribution)

Year	*Domestic Light and Power*	*Commercial Light and Power*	*Industry*	*Public Lighting*	*Irrigation*	*Water Works and Sewage Pumping*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1951	44	27	22	5	..	2	100
1952	41	31	21	5	..	2	100
1953	38	24	31	5	..	2	100
1954	36	19	33	5	..	7	100
1955	30	16	42	4	2	6	100
1956	26	13	50	4	..	7	100
1957-58	19	8	71	1	..	1	100
1958-59	5·5	2·4	91·2	0·3	..	0·6	100
1959-60	3·7	1·6	93·6	0·3	0·2	0·6	100

NOTE: These have been worked out by the NCAER on the basis of the data given in "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), CWPC.

TABLE 47

PATTERN OF POWER SALES IN PUBLIC UTILITY UNDERTAKINGS IN INDIA (1951 to 1959-60)

(Percentages)

Year	*Domestic Light and Small Power*	*Commercial Light and Small Power*	*Industry*	*Public Lighting*	*Irrigation*	*Water Works and Sewage Pumping*	*Traction*	*Total*
1951	12·4	6·9	63·7	1·4	4·3	4·4	4·1	100·0
1952	12·6	6·7	64·0	1·5	4·3	4·4	4·5	100·0
1953	12·3	7·1	64·6	1·5	3·8	4·3	5·1	100·0
1954	12·1	7·1	65·2	1·5	3·7	4·3	5·7	100·0
1955	12·0	7·2	66·0	1·5	3·6	4·0	6·1	100·0
1956	11·7	6·8	66·9	1·5	4·0	4·0	6·4	100·0
1957-58	11·6	6·5	66·0	1·5	6·0	3·8	6·5	100·0
1958-59	11·5	6·3	67·0	1·5	6·0	3·6	6·9	100·0
1959-60	11·1	6·2	68·4	1·4	5·9	3·5	3·6	100·0

NOTE: This table has been computed by the NCAER on the basis of the data given in "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), CWPC.

TABLE 48

PER CAPITA CONSUMPTION OF ELECTRICITY IN ORISSA AND LEADING STATES OF INDIA

(Public Utilities only)

(in kWh)

	1951	*1955*	*1959-60*
Orissa	*0·35*	*0.78*	*27.89*
Domestic	0·15	0·24	1·03
Commercial	0·10	0·13	0·44
Industries	0·08	0·37	26·31
Public lighting	0·02	0·03	0·07
Irrigation	..	0·01	0·04
West Bengal	*41·68*	*61·56*	*79·91*
Bombay	*43·95*	*62·06*	*62·70*
Bihar	*2·95*	*6·96*	*17·83*
Madras	*10·62*	*23·15*	*43·07*
ALL-INDIA	13·25	19·65	30·40

SOURCE: "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), CWPC.

TABLE 49

PATTERN OF ELECTRICITY SALES (SELF-GENERATION INCLUDED)

(1955 to 1959-60)

(Percentages)

Year	*Domestic Light and Small Power*	*Commercial Light and Small Power*	*Industry*	*Public Lighting*	*Irrigation*	*Water Works and Sewage Pumping*	*Traction*	*Total*
1955	3·8	2·0	92·7	0·5	0·2	0·7	..	100·0
1956	4·2	2·0	92·0	0·6	..	1·1	..	100·0
1957-58	9·3	3·8	85·7	0·5	..	0·6	..	100·0
1958-59	4·4	1·9	92·8	0·3	..	0·5	..	100·0
1959-60	2·8	1·2	95·2	0·2	0·1	0·5	..	100·0

NOTE: This table has been computed by the NCAER on the basis of the data given in "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), CWPC.

TABLE 50

INDUSTRIAL POWER CONSUMPTION—SELF-GENERATION'S SHARE (ALL-INDIA AND ORISSA)

(1955 to 1959-60)

(Million kWh)

Year	*All-India*		*Orissa*		*Share of Self-generation to Total*	
	Total	*Self-generation*	*Total*	*Self-generation*	*All-India*	*Orissa*
1955	6382·604	2184·815	84·488	79·700	31·74	94·33
1956	7532·753	2208·509	87·578	80·000	29·33	91·35
1957-58	8569·549	2288·290	111·790	67·119	26·70	60·04
1958-59	9644·717	2420·683	307·098	66·648	31·84	21·70
1959-60	11187·473	2760·817	572·966	146·475	24·67	25·56

SOURCE: "Public Electricity Supply: All-India Statistics, 1959-60, General Review" (mimeographed), CWPC.

TABLE 51

HYDRO ELECTRIC POWER POTENTIAL

Hydel Sources	*Power Potential in MW (60 per cent Load Factor)*
1. Sabari[a]	1,000
2. Upper Mahanadi	278
3. Lower Mahanadi	558
4. Lower Brahmani	255
5. Baitarani	275
6. Upper Brahmani[b]	509
TOTAL	2,875[c]

[a] Includes share of Andhra Pradesh.

[b] Includes share of Bihar.

[c] Net share of Orissa of not less than 2 million kW.

TABLE 52

ESTIMATED INSTALLED CAPACITY, GENERATION AND EFFECTIVE CONSUMPTION OF ELECTRICITY

(1960-61 to 1970-71)

(Self-generation included)

	Unit	*1960-61*	*1965-66*	*1970-71*
1. Installed Capacity[a]	MW	264	634	1,054
2. kWh/kW Installed	per year	3,000[b]	3,500[b]	4,000[b]
3. Generation	Million kWh	792	2,225	4,216
4. Losses[c]	,,	95	267	506
5. Effective Consumption	,,	697	1,958	3,719
(*a*) Index	unit	100	280	530
(*b*) Growth Rate (compounded)	Annual percentage		22·5	13·6

[a] Table 53, col. 6.

[b] 2,830 in 1959-60. (The value will steadily improve.)

[c] 12 per cent of total generation (in 1959-60 this was 11·8 per cent).

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

TABLE 53

ESTIMATED MAXIMUM DEMAND AND ADDITIONS TO GENERATING CAPACITY (1960-61 to 1970-71)

(MW)

Year	*Maximum Demand*	*Installed Capacity*			
		Needed	*Existing*	*Net Additions*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)
1960-61	190[a]	219	264[a]		
1961-62	230	265		147[b]	411
1962-63	278	320			411
1963-64	337	388		60[c]	471
1964-65	410	472		163[d]	634
1965-66	500	575			634
1966-67	558	642		60[e]	694
1967-68	621	714		60[f]	754
1968-69	692	796		100[g]	854
1969-70	772	888		100[g]	954
1970-71	860	989		100[g]	1,054
1971-72	950	1,093		100[g]	1,154
1972-73	1,050	1,208		100[g]	1,254
1973-74	1,160	1,324			
1975-76	1,415	1,630			
1977-78	1,720	1,980			

[a] Chief Engineer, Electricity, Orissa.

[b] Hirakud Stage 2 $(=2\times37{\cdot}5+3\times24)$.

[c] Talcher 1 set $=$ 60 MW.

[d] Talcher sets 2, 3 & 4 (3×60) *minus* uneconomic diesel and steam sets (17 MW).

[e] Talcher extension 5th set } suggested.
[f] Talcher extension 6th set }

[g] Hydel schemes.

NOTE: Col. (3) = Col (2) × 1.15.
Col. (2) = Growth rate 21 per cent (Third Plan)
annual 11·5 per cent (Fourth Plan)
10·4 per cent (Fifth Plan).

TABLE 54

INVESTMENT FOR POWER DEVELOPMENT (1960-61 to 1970-71)

Period	*Description*	*Capacity* (MW)	*Maturing during Plan Number*	*Investment* Rs./kW	*Investment* *Total* (Rs. crores)
(1)	(2)	(3)	(4)	(5)	(6)
1960-61 to 1965-66	Thermal	240	Third	1,800	43·2
	Hydro	147[a]	,,	600	8·8
	Hydro	300	Fourth	800[b]	24·0
	Hydro	200	Fifth	400[c]	8·0
	Investigation	..	..	..	1·0[d]
	Total				*85·0*
1965-66 to 1970-71	Thermal	120	Third	1,800	21·6
	Hydro	300	Fourth	1,200[b]	36·0
	Hydro	200	Fifth	1,200[c]	24·0
	Hydro	400	Fifth	300[e]	12·0
	Hydro	200	Sixth	200[f]	4·0
	Investigation	..	..	..	1·0
	Total				*98·6*

[a] Stage II, Hirakud.

[b] 40% during Third Plan; 60% during Fourth Plan.

[c] 20% during Third Plan; 60% during Fourth Plan.

[d] Lumpsum.

[e] 15% during Fourth Plan; 85% during Fifth Plan.

[f] 10% during Fourth Plan.

NOTE: (1) The above includes requirements for generation, transformation, transmission and distribution.
(2) Total investment for:

Thermal	1,800 Rs./kW
Hydro	2,000 ,,

(Based on the study of Natural Resources Division, Planning Commission.)

TABLE 55

ROAD DEVELOPMENT AS ENVISAGED IN THE CHIEF ENGINEER'S ROAD DEVELOPMENT PLAN (1961–81)

	Mileage at commencement of 20-year Plan	*Mileage by end of 20-year Plan*	*Increase in Mileage*
National Highways	852	1,642	790
State Highways	1,415	2,942	1,527
Major District Roads	3,129	4,170	1,041
Other District Roads[a]	886	7,174	6,288

[a] PWD portion only.

SOURCE: Chief Engineer, Roads, Government of Orissa.

TABLE 56

TENTATIVE PROPOSALS OF STATE GOVERNMENT FOR ROAD DEVELOPMENT (1961–66)

	State Sector	*Central Sector*	*Total*
Improvement of Existing Roads (miles)	1,228	160	1,388
Construction of New Roads (miles)	40	22	62
Bridges continued from Second Plan (number)	28	14	42
Construction of New Bridges (number)	14	45	59

TABLE 57

SUGGESTED PROGRAMME OF ROAD DEVELOPMENT (1961–66)

	Mileage	*Cost* (Rs. crores)
National Highways	264	5·5
State Highways	464	6·4
Major District Roads	417	2·6
Other District Roads	1,952	2·7
TOTAL	3,097	17·2

TABLE 58

ESTIMATE OF CAPITAL EXPENDITURE ON NEW (RAILWAY) LINES AND OPEN LINE FACILITIES

(Rs. crores)

1. Extension of Rourkela-Dumaro line to Talcher	11·6
2. Rail-link from Tomka upto Railway main line, and South Eastern siding	3·0
3. Rail-link from Cuttack to Paradip	10·0
4. Rail-link between Gua and Manoharpur	5·8
TOTAL	30·4

TABLE 59

PROGRAMME FOR WATERWAY DEVELOPMENT (1961–66)

(Rs. lakhs)

	Cost
1. Improvement in the Mahanadi from Dholpur to Cuttack	50
2. Dredgers for maintaining depths as on canals, estuaries and on Mahanadi	60
3. Major Improvements to High Level Canal I, Talando and Kendra Canal	200
4. Development of country-boat cooperatives	50
5. Terminal facilities at Jenapur and Paradip	40
6. Ferries in the estuaries of the Mahanadi, Dhamsa and Devi rivers	50
TOTAL	450

TABLE 60

SUGGESTED INVESTMENT IN IMPROVEMENT OF TRANSPORT (1961-66)

(Rs. crores)

	Cost
1. Railways	30·4
2. Roads	17·2
3. Forest Roads	4·0
4. Inland Waterways	4·5
5. Road Transport	1·5
6. Bridges, etc.	3·2
TOTAL	60·8

NOTE: In addition, there will be these investments during the period 1961–71: new goods carriers (private sector) Rs. 30 crores, Paradip port (Centre) Rs. 10 crores and communications (Centre) Rs. 5·8 crores.

TABLE 61

ADDITIONAL MANPOWER REQUIREMENT IN NON-AGRICULTURAL OCCUPATION (1961–71)

(in thousands)

	Employment in 1961[b]	*Additional Manpower Requirements for the period 1961-71*	*Employment in 1971*[b]
Factory Industry	79	96	175
Non-factory Industry	430	95	525
Mining	82	195	277
Power	6	32	38
Construction	199	151	350
Tertiary	1,030	670	1,700
TOTAL	1,826	1,239	3,065

[a] For details, see Table 66.

[b] (*i*) The sectorwise net outputs for 1961 are as given in Table 8 for 1971 as given in Table 86.
(*ii*) Increase in output per worker—
in factory industry, mining and power is based on individual employment estimates for new capacity or expansion in capacity suggested;
in non-factory industry, it is derived from independent estimates of net output and employment increase. Employment is taken to increase at the rate of natural increase of population;
in construction, it is assumed to increase at the rate of 1·5 per year per cent during 1951–61 and 3·3 per cent per year during 1961–71 and in tertiary sector it is assumed to increase by 3 per cent per year during 1951–61 and 4 per cent per year during 1961–71.

TABLE 62

PROPORTION OF THE TOTAL WORKING FORCE ENGAGED IN DIFFERENT SECTORS OF THE ECONOMY IN 1961 AND 1971[a]

(Percentages)

	1961	*1971*
1. *Primary Sector*	*73·1*	*62·8*
2. *Secondary Sector*	*11·7*	*16·6*
Factory Industry	1·2	2·1
Non-factory Industry	6·3	6·4
Mining	1·2	3·4
Power	0·1	0·5
Construction	2·9	4·2
3. *Tertiary Sector*	*15·2*	*20·6*
TOTAL	100·0	100·0

[a] For details, see Table 66.

TABLE 63

NET OUTPUT PER WORKER BY DIFFERENT SECTORS OF THE ECONOMY IN 1961 AND 1971.

	1961			1971		
	Net Output (Rs. crores)	*Employment* (thousands)	*Net Output per Worker* (Rs.)	*Net Output* (Rs. crores)	*Employment* (thousands)	*Net Output per Worker* (Rs.)
Factory Industry	25·5	85	3,000	201·2	213	9,441
Non-factory Industry	24·5	430	570	39·2	525	747
Mining	9·0	82	1,098	42·2	277	1,523
Construction	12·0	199	603	24·9	350	711
Tertiary Activities	113·7	1,030	1,103	267·2	1,700	1,572
TOTAL	184·7	1,826	1,012	574·7	3,065	1,875

TABLE 64

REQUIREMENT AND SUPPLY OF TECHNICAL PERSONNEL

Additional Requirements of Engineers and Diploma Holders for the period 1961-71[a]		*Annual Requirements for the period 1961-71*	*Annual Supply for the period 1961-71*	
Factory Industry	4,575		Engineers	155[b]
Mining	2,035		Diploma Holder	460[b]
Government Programmes	2,290			
TOTAL	8,900	890		
Plus Replacement Requirements	..	150		
TOTAL		1,040		615

[a] For method of estimating requirement, see Appendix 9.

[b] After allowing 15 per cent for wastage requirement; see Appendix 9.

TABLE 65

REQUIREMENT AND SUPPLY OF CRAFTSMEN

Additional Requirements of Craftsmen for the period 1961-71[a]		*Annual Requirements for the period 1961-71*	*Annual Supply for the period 1961-71*	
Factory Industry	29,301		Industrial Schools	960[b]
Mining	61,035		Training Coal-mining	200
Government Programmes	1,905		Training by Tribal Welfare Department	100
TOTAL	92,249	9,225		
Plus Replacement Requirements		1,737	In-plant and unorganized training	1,300
TOTAL		10,962		2,560

[a] For method of estimating requirement see Appendix 9.

[b] After allowing 15 per cent for wastage; see Appendix 9.

TABLE 66

OUTPUT, EMPLOYMENT AND LABOUR PRODUCTIVITY (1951, 1961 AND 1971)

	1951			*1961*			*1971*		
	Net Output (Rs. crores)	*Employment* (Thousands)	*Net Output per Worker* (Rs.)	*Net Output* (Rs. crores)	*Employment* (Thousands)	*Net Output per Worker* (Rs.)	*Net Output* (Rs. crores)	*Employment* (Thousands)	*Net Output per Worker* (Rs.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Agriculture and Allied Activities	165·4	4,041	409	188·0	4,954[a]	379	315·1	5,175[a]	609
Factory Industry	3·1	24	1,292	22·1	79	2,797	179·4	175	10,251
Non-Factory Industry	20·1	385	522	24·5	430	570	39·2	525	747
Mining	4·5	40	1,125	9·0	82	1,098	42·2	277	1,523
Power	Neg.	Neg.	Neg.	3·4	6	5,666	21·8	38	5,737
Construction	2·5	49	510	11·9	199	603	24·9	350	711
Tertiary	91·0	1,076	846	113·7	1,030	1,103	273·5	1,700	1,609
TOTAL	286·6	5,615	510	372·6	6,780[b]	550	896·1	8,240[b]	1,087

[a] Employment in agriculture is residual.

[b] Total working force for 1961 and 1971 is estimated on the basis of 1951 participation ratios—38·6 per cent of the total population.

TABLE 67

ESTIMATED VITAL RATES OF REORGANIZED STATES FOR THE PERIOD 1941–50

State	*Birth Rate* (Per thousand population)	*Death Rate* (Per thousand population)	*Rate of Natural Increase* (Percentage)
1. Andhra	38·2	25·1	13·1
2. Assam	49·8	34·9	14·9
3. Bihar	42·2	29·8	12·4
4. Bombay	42·7	25·8	16·9
5. Kerala	38·2	19·9	18·3
6. Madhya Pradesh	45·2	37·2	8·0
7. Madras	35·8	22·7	13·1
8. Mysore	40·2	23·6	16·6
9. *Orissa*	*41·8*	*33·3*	*8·5*
10. Punjab	45·3	28·2	17·1
11. Rajasthan	47·7	32·6	15·1
12. Uttar Pradesh	41·5	30·1	11·4
13. West Bengal	40·0	27·0	13·0
ALL-INDIA	41·4	28·5	13·0

SOURCE: NCAER Estimates (made for population projections).

TABLE 68

DEATH RATE BY CAUSES (1951–57)

Year	*Fever*	*Dysentery and Diarrhoea*	*Cholera*	*Small-pox*	*Respiratory Diseases*	*Others*	*Total*
1951	10·47	1·20	0·54	0·86	0·58	7·94	21·52
1952	9·57	0·69	0·57	0·25	0·52	6·05	15·17
1953	11·88	1·04	0·32	0·13	0·54	5·14	19·04
1954	9·68	0·82	0·08	0·25	0·48	4·67	19·98
1955	8·93	0·88	0·06	0·15	0·51	4·76	15·29
1956	8·86	1·17	0·71	0·12	0·68	4·63	16·17
1957	11·33	1·28	0·25	0·38	0·76	4·98	18·98
Average	10·10	1·01	0·36	0·31	0·58	5·45	17·45
ALL-INDIA AVERAGE	6·31	0·66	0·16	0·17	1·26	4·43	12·99

SOURCE: 1. Director-General of Health Services, Ministry of Health.
2. Director of Health Services, Government of Orissa.
3. *Statistical Abstract*, Orissa, 1957.

TABLE 69

CAUSE SPECIFIC DEATH RATES: STATES AND ALL-INDIA (1957)

(Number of deaths per 1,000 population)

State	*Fever*	*Dysentery and Diarrhoea*	*Cholera*	*Small-pox*	*Respiratory Diseases*	*Others*	*Total*
Andhra	6·2	0·7	0·17	0·4	1·0	7·2	15·7
Bihar	..	0·05	0·29	0·1	0·07	1·0	7·8
Bombay	5·4	0·7	0·13	0·2	2·3	6·2	15·0
Kerala	1·1	0·7	..	0·04	1·0	6·8	9·6
Madras	2·3	1·1	0·09	0·1	1·4	9·2	14·2
Mysore	3·4	1·1	0·01	0·2	0·9	3·9	9·5
Orissa	*11·4*	*1·3*	*0·3*	*0·4*	*0·8*	*5·0*	*19·0*
Punjab	9·6	0·4	..	0·01	2·3	2·5	14·8
Uttar Pradesh	5·5	0·4	0·2	0·1	0·7	1·6	8·5
West Bengal	4·1	0·6	0·1	0·4	1·1	3·7	10·0
ALL-INDIA	5·0	0·6	0·2	0·2	1·1	4·0	10·6

SOURCE: Director-General of Health Services, Ministry of Health (as quoted in *Statistical Abstract, India*, 1957-58).

TABLE 70

DEATH RATES FROM CHIEF DISEASES BY DISTRICTS (1952 AND 1957)

Districts	*Fever*		*Dysentery and Diarrhoea*		*Respiratory Diseases*		*Cholera*		*Small-pox*	
	1952	1957	1952	1957	1952	1957	1952	1957	1952	1957
Balasore	13·47	10·18	0·36	0·29	0·12	0·09	0·63	0·50	0·22	0·22
Bolangir	19·18	17·65	0·93	0·96	0·60	0·78	1·76	0·07	0·28	0·02
Cuttack	11·01	13·55	2·37	1·2	0·78	0·36	0·73	0·56	1·89	0·58
Dhenkanal	10·44	13·55	0·61	1·12	0·26	0·36	0·09	0·81	0·20	1·51
Ganjam (Plain)	8·78	9·40	1·01	1·20	0·61	0·66	0·12	0·04	0·06	0·27
Ganjam (Agency)	1·48	N.A	0·14	N.A	0·03	N.A	N.A	N.A	N.A	N.A
Kalshandu	16·83	16·03	0·30	0·44	0·12	0·28	0·20	0·10	0·77	0·15
Keonjhar	14·83	16·03	0·26	0·51	0·04	0·29	0·01	0·15	0·13	0·37
Khondmals (Phulbani)	18·18	14·94	0·69	1·48	0·21	0·90	2·62	N.A	0·17	0·02
Koraput	12·29	4·53	0·45	0·65	0·17	1·52	0·02	0·05	0·20	0·08
Mayurbhanj	12·29	14·20	0·45	0·50	0·17	0·36	0·02	0·06	0,20	0·17
Puri	9·72	7·68	1·46	2·19	1·39	1·31	0·42	0·25	0·35	0·59
Sambalpur	12·30	10·87	1·62	0·99	1·12	1·01	0·51	0·03	0·60	0·07
Sundargarh	12·66	11·04	1·29	0·95	0·69	0·68	0·03	0·02	0·22	0·08
Orissa State	*12·04*	*11·35*	*1·16*	*1·28*	*0·52*	*0·76*	*0·56*	*0·25*	*0·62*	*0·38*
ALL-INDIA	8·5	5·0	0·8	0·6	1·21	1·1	0·23	0·2	1·18	0·2

SOURCE: *Statistical Abstract*, Orissa, 1957.
Statistical Abstract, India, 1957-58.

TABLE 71

CAUSE SPECIFIC DEATH RATES: ORISSA AND ALL-INDIA (1952 AND 1957)

(Rural, Urban and General)
(Number of deaths per 1,000 of population)

Diseases	*Orissa*						*All-India*					
	1952			*1957*			*1952*			*1957*		
	Rural	*Urban*	*General*	*Rural*	*Urban*	*General*	*Rural*	*Urban*	*General*	*Rural*	*Urban*	*General*
1. Fevers (including Malaria)	12·26	4·46	12·04	11·56	4·51	11·33	9·7	2·81	8·5	5·5	2·5	4·99
2. Dysentery and Diarrhoea	1·14	1·81	1·16	1·24	2·56	1·28	0·71	1·23	0·8	0·5	0·8	0·6
3. Cholera	0·51	1·49	0·5	0·29	0·01	0·25	0·24	0.17	0·23	0·03	0·05	0·03
4. Respiratory Diseases	0·51	0·93	0·52	0·74	1·22	0·76	1·04	2·05	1·21	1·1	2·2	1·3
5. Small-pox	0·63	0·02	0·62	0·36	0·76	0·38	0·20	0·68	0·18	0·10	0·07	0·1

SOURCES: 1. Orissa: Director of Health Services.
2. India: Director-General of Health Services;
Health Statistics of India, 1958.

CSL

TABLE 72

PER CAPITA MONTHLY CONSUMER EXPENDITURE IN RURAL AREAS: STATES AND ALL-INDIA (1952)

(Rs. per month per person)

State	*Total*	*Food*	*Non-food*	*Grains*	*Milk, etc.*	*Meat, Egg, Fish*	*Sugar*	*Edible Oil*
1. Assam	24·24	15·82	8·42	10·43	1·08	1·07	0·44	0·48
2. Bihar	24·03	16·10	7·93	11·42	1·16	0·41	0·26	0·38
3. Bombay	19·32	11·40	7·92	11·40	1·34	0·29	0·61	0·52
4. Madhya Pradesh	16·40	10·08	6·32	6·55	0·76	0·18	0·31	0·41
5. Madras	18·28	12·14	6.14	7·96	0·82	0·50	0·23	0·48
6. *Orissa*	*15·02*	*10·11*	*4·91*	*7·15*	*0·38*	*0·50*	*0·21*	*0·28*
7. Punjab	31·96	19·16	12·80	9·64	5·40	0·23	1·08	0·83
8. Saurashtra	20·58	13·59	6·99	7·28	2·80	0·05	1·17	0·64
9. Travancore	18·64	11·17	7·47	6·10	0·43	0·78	0·40	0·57
10. Uttar Pradesh	23·45	14·99	8·46	9·38	1·66	0·25	0·70	0·46
11. West Bengal	28·10	16·63	11·47	10·91	0·88	1·26	0·38	0·65
ALL-INDIA	27·81	16·65	11·16	9·63	3·92	0·15	0·83	0·45

SOURCE: *Report of the National Sample Survey: Fourth Round.*

TABLE 73

FOOD CONSUMPTION STANDARDS

(Ozs. per adult unit)

Item	*Recommended Diet*	*All-India Average*	*Orissa*	
			Rural	*Cuttack*
(1)	(2)	(3)	(4)	(5)
Cereals	14	16·62	23·69	19·3
Pulses	3	2·26	0·47	0·9
Leafy Vegetables	4	0·85	2·11	1·3
Other Vegetables	6	4·10	1·68	5·4
Ghee and Oil	2	0·92	Negligible	0·2
Milk and Milk Products	10	3·31	..	0·3
Meat, Fish and Eggs	4	0·94	0·09	0·7
Fruits and Nuts	3	0·58	..	0·1
Sugar and Jaggery	2	0·67	..	0·1
Condiments	..	0·41	..	..

NOTE: Columns (2) and (3) from p. 18, column (4) from p. 119 and column (5) from p. 120 of ICMR Report No. 20.

TABLE 74

REGISTERED DOCTORS AND LICENTIATES IN ALL-INDIA, ORISSA AND SELECTED STATES (1956)

Area	*Graduates*	*Licentiates*	*Total Doctors*	*Number of Doctors and Licentiates per 100,000 Population*
Bombay	9,623	8,009	17,623	33
Madhya Pradesh	950	1,403	2,353	8
Orissa	*515*	*772*	*1,287*	*8*
West Bengal	7,246	14,283	21,529	78
ALL-INDIA	34,077	39,931	74,008	19

SOURCE: *Triennial Report of Directorate General of Health Services, 1954-55,* Government of India, 1959.

TABLE 75

NURSES, MIDWIVES, ETC., IN ORISSA AND ALL-INDIA (1956)

Region	*Nurses*		*Midwives*		*Dais*		*Health Inspectors*		*Vaccinators*	
	Total Number	*Per 100,000 Population*	*Total Number*	*Per 100,000 Population*	*Total Number*	*Per 100,000 Population*	*Total Number*	*Per 100,000 Population*	*Total Number*	*Per 100,000 Population*
All-India[a]	24,724	6	28,423	7	7,977	2	4,229[b]	1·1	4,312[b]	1·1
Orissa[c]	294	2	232	1·5	318	2	250	1·5	N.A.	N.A.

[a] *Triennial Report of DGHS, 1954-55,* Governmen tof India, 1959.
[b] *Health Statistics of India, DGHS, 1954-55,* Government of India, 1959.
[c] *Handbook of Orissa,* Home Department, Government of Orissa, 1958.

TABLE 76

PROVISION FOR MEDICAL AND HEALTH PROGRAMMES UNDER THE SECOND FIVE YEAR PLAN

	Provision (Rs. lakhs)	*Percentage*
1. Administration	3·99	37·72
2. Education and Training	111·65	
3. Medical Institution	12·50	
4. Hospitals	12·20	
5. Health Ranges	0·40	
6. Public Health Organization and New Municipalities	2·65	
7. New Primary Health Units	58·12	15·30
8. Control of Diseases	109·94	28·93
9. Maternity and Child Welfare	4·37	4·87
10. Indian Medical System	5·41	
11. Family Planning	3·24	
12. Medical Laboratories	5·48	
13. Statistics and Publicity	2·55	0·68
14. Water Supply and Sanitation	47·50	12·50
TOTAL	380·00	100·00

TABLE 77

ADDITIONAL HEALTH PERSONNEL REQUIRED BY 1971

Category of Personnel (1)	*Total Number Available in 1959*[a] (2)	*Total Number Required in 1971*[b] (3)	*Additional Personnel Required by 1971 (3–2)* (4)
1. Doctors (Graduates and Licentiates)	1,401	4,200	2,799
2. Nurses	343	3,900	3,557
3. Midwives	269	3,900	3,631
4. Dais	457	3,900	3,443
5. Health Visitors and Health and Sanitary Inspectors	323	1,000	677
6. Compounders	N.A.	1,000[c]	..

[a] SOURCE: Director of Health Services, Government of Orissa.

[b] These estimates are based on norms adopted for all-India Second Plan: These are as follows:

Doctors	20 for 100,000 population
Nurses	18 to 19 for 100,000 population
Midwives	18 to 19 for 100,000 population
Health Visitors and Health and Sanitary Inspectors	4 to 5 for 100,000 population
Dais	18 to 19 for 100,000 population

[c] Estimates for additional compounders required for 1961–71 are arbitrary and are based on an assumption that a compounder may be required for each of the 1,000 new Primary Health Units proposed for the period 1961–71.

N.A.=Not Available.

TABLE 78

ESTIMATED ALLOCATION FOR HEALTH PLAN SCHEMES (1961–71)

Schemes	*Allocation Required* (Rs. crores)
1. Malaria Control	0·50
2. Supply of Anti-Malaria Drugs	0·4
3. Filaria Control	0·60
4. Urban Water Supply	3·00
5. Urban Drainage and Sewage Facilities	14·40
6. Rural Water Supply	1·75
7. Mobile Health Units (Cholera and Small-pox Control)	0·15
8. T.B. Control	1·50
9. Supply of Vitamin Tablets, etc.	0·15
10. Medical Education and Training	10·80
11. Primary Health Units	10·00
12. Hospitals and Dispensaries	5·00
13. Vital Statistics	0·50
14. Health Publicity	0·50
15. Maternity and Child Welfare, Family Planning, etc.	0·45
TOTAL	49·70

NOTE: See Appendix 10 for method of estimation.

TABLE 79

CONSTRUCTION IN PUBLIC HEALTH PLAN (1961–71)

(Rs. crores)

Schemes	*Total Outlay*	*Percentage of Construction Expenditure*	*Cost of Construction*	*Current Outlay*
1. Malaria Control	0·50	..	..	0·50
2. Supply of Anti-Malaria Drugs	0·40	..	..	0·40
3. Filaria Control	0·60	..	..	0·60
4. Urban Water Supply	3·00	100	3·00	..
5. Urban Drainage and Sewage Facilities	14·40	100	14·40	..
6. Rural Water Supply	1·75	100	1·75	..
7. Mobile Health Units	0·15	..	..	0·15
8. T.B. Control	1·50	20	0·30	1·20
9. Supply of Vitamin Tablets, etc.	0·15	..	..	0·15
10. Medical Education	10·80	30	3·24	7·56
11. Primary Health Units	10·00	20	2·00	8·00
12. Hospitals and Dispensaries	5·00	50	2·50	2·50
13. Vital Statistics	0·50	..	..	0·50
14. Health Publicity	0·50	..	..	0·50
15. Maternity and Child Welfare and Family Planning	0·45	..	..	0·45
TOTAL	49·70	54·7	27·19	22·51

TABLE 80

DIRECT EMPLOYMENT POTENTIAL OF PROPOSED HEALTH PLAN (1961–71)

Category of Personnel	*Employment Potential*
1. Doctors	2,800
2. Nurses	3,500
3. Midwives	3,600
4. Dais	3,400
5. Health Visitors	700
6. Compounders	1,000[a]
7. Unskilled Personnel	15,000[b]
TOTAL	30,000

[a] At the rate of one compounder for each primary health unit.

[b] A ratio of 1 unskilled person for every person in all the other skilled categories, has been assumed. See Table 77 for estimates of categories 1 to 6.

TABLE 81

STATEMENT SHOWING THE COMPARATIVE REVENUE POSITION OF THE STATE GOVERNMENTS (1957-58)

	Andhra Pradesh	*Assam*	*Bihar*	*Bombay*	*Jammu and Kashmir*	*Kerala*	*Madhya Pradesh*	*Madras*	*Mysore*	*Orissa*	*Punjab*	*Rajasthan*	*Uttar Pradesh*	*West Bengal*	*Total*
1. Per Capita State Taxes (Rs.)	9·08	12·53	4·93	13·25	2·04	8·47	7·49	9·60	7·84	*4·07*	10·31	7·95	7·11	12·25	8·74
2. Per Capita Tax Revenue (Rs.)	11·90	15·73	7·61	16·74	4·95	11·26	10·40	12·59	10·71	*6·85*	13·22	10·74	9·91	16·02	11·74
3. Per Capita Total Revenue (Rs.)	17·42	28·12	11·18	22·77	17·17	17·56	17·78	18·71	19·43	*13·46*	22·18	16·36	13·70	22·79	17·76
4. Per Capita Grants from Union Government (Rs.)	2·29	8·29	2·32	1·04	7·35	2·19	2·88	1·98	4·08	*3·73*	2·39	3·05	1·50	3·81	2·51
5. Shared Taxes as percentage of Total Revenue	23·65[a]	20·41	35·21	20·83	58·70	24·75	28·01	23·71	25·83	*40·98*	22·04	20·45	28·29	23·50	25·23
6. Union Grants as Percentage of Total Revenue	13·15	29·48	20·77	4·56	42·82	12·48	16·17	10·56	21·00	*27·70*	10·67	18·63	10.92	16·71	14·16
7. Net Revenue from Public Enterprises as Percentage of Total Revenue[b]	7·73	2·31	0·57	4·36	19·30	8·37	11·38	3·26	12·09	*10·47*	9·46	2·52	7·82	0·39	6·00

[a] Includes Agricultural Income Tax.

[b] Irrigation receipts for which capital accounts are not kept are taken on a gross basis.

SOURCES: *Reserve Bank of India Bulletin*, June 1959, pp. 686-92. Absolute figures of revenues other than Union Government grants are taken from the Bulletin; Union grants to State Governments are derived from the State budgets.
Population figures for the above per capita calculations are based on projections made by the National Council.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

TABLE 82

STATEMENT SHOWING TAX AND NON-TAX REVENUE OF ORISSA (1950-51 to 1959-60)

(Rs. lakhs)

Heads of Revenue	*1950-51 Accounts*	*1951-52 Accounts*	*1952-53 Accounts*	*1953-54 Accounts*	*1954-55 Accounts*	*1955-56 Accounts*	*1956-57 Accounts*	*1957-58 Accounts*	*1958-59 Accounts*	*1959-60 Accounts*	*1960-61 R.E.*
TAX REVENUE											
1. TAXES ON INCOME											
(*i*) Share of Income Tax	142	157	207	209	208	217	206	274	283	309	324
(*ii*) Agricultural Income Tax	10	13	6	5	3	2	2	3	3	3	3
2. TAXES ON PROPERTY AND CAPITAL TRANSACTIONS											
(*i*) Estate Duty	..	..	..	..	2	6	8	7	6	7	8
(*ii*) Land Revenue	103	104	114	149	127	124	159	199	229	237	314
(*a*) *Land Revenue Collections*	*102*	*103*	*112*	*147*	*126*	*124*	*159*	*197*	*153*	*134*	*284*
(*b*) *Others*	*1*	*1*	*2*	*2*	*1*	..	..	*2*	*76*	*103*	*30*
(*iii*) Stamps and Registration	74	81	88	90	89	59	62	68	70	80	79
3. TAXES ON COMMODITIES AND SERVICES											
(*i*) Share of Union Excise	..	..	74	72	68	75	77	159	254	262	267
(*ii*) State Excise	213	200	181	167	157	143	97	102	120	108	125
(*iii*) General Sales Tax	80	110	112	112	132	118	130	166	186	212	290
(*iv*) Sales Tax, on Motor Spirit	13	15	16	17	19	28	23	33	27	30	37
(*v*) Entertainment Tax	6	6	6	6	9	6	8	8	10	12	14
(*vi*) Electricity Duties	..	..	..	..	..	..	1	1	1	3	4
(*vii*) Tax on Motor Vehicles	11	11	10	11	11	40	48	66	77	76	79
(*viii*) Passengers and Goods Transport Tax	..	..	..	..	..	..	..	..	..	5	44
(*ix*) Tax on Railway Fares	..	..	..	..	..	..	..	9	19	23	24
TOTAL TAX REVENUE	652	698	815	838	824	819	820	1095	1285	1367	1612

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
31
CSL

TABLE 82 (*Continued*)

Heads of Revenue	*1950-51 Accounts*	*1951-52 Accounts*	*1952-53 Accounts*	*1953-54 Accounts*	*1954-55 Accounts*	*1955-56 Accounts*	*1956-57 Accounts*	*1957-58 Accounts*	*1958-59 Accounts*	*1959-60 Accounts*	*1960-61 R.E.*
NON-TAX REVENUE											
1. Administrative Receipts	104	106	126	87	88	98	113	167	217	191	377
2. Forests	100	97	89	111	143	159	189	257	279	313	281
3. Irrigation (net)	(–)4	2	1	(–)7	(–)11	(–)25	(–)18	(–)10	(–)9	(–)4	(–)12
(i) *For which Capital Accounts are kept*	(–)*6*	..	(–)*1*	(–)*9*	(–)*13*	(–)*27*	(–)*20*	(–)*12*	(–)*13*	(–)*6*	(–)*14*
(ii) *For which Capital Accounts are not kept*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*4*	*2*	*2*
4. Electricity Schemes (net)	(–)2	(–)3	(–)4	..	1	6	(–)2	13	107	24	103
5. Road and Water Transport (net)	..	3	4	3	4	1	15	22	31	28	30
6. Interest	21	17	21	22	22	23	23	25	39	38	67
7. Grants	116	135	175	148	269	499	486	589	706	875	1304
(i) *Union Government*	*116*	*133*	*172*	*148*	*268*	*490*	*466*	*589*	*706*	*875*	*1304*
(ii) *Other*	..	*2*	*3*	..	*1*	*9*	*20*	..	..	..	..
8. Extra-ordinary Receipts	29	82	..	1	14	10	6	2	..	(–)40	10
9. Other Non-Tax Revenue	16	64	38	23	46	22	25	45	110	79	119
TOTAL NON-TAX REVENUE	379	503	448	390	577	793	838	1110	1480	1504	2279
TOTAL REVENUE	1031	1201	1263	1228	1401	1512	1657	2205	2765	2871	3891

NOTE: 1. Other Non-Tax Revenue includes Receipts in aid of Superannuation, Stationery and Printing, Miscellaneous Receipts and Miscellaneous Adjustments between Union and State Governments.
2. All grants from the Union are shown under Item 7.

SOURCE: Budgets of Orissa Government; adapted.

07

CSL

TABLE 83

FUNCTIONAL ANALYSIS OF EXPENDITURE BY THE GOVERNMENT OF ORISSA
(1951-52 and 1957-58)

(Rs. lakhs)

	1951-52		*1957-58*		*1951-52 to 1957-58*
	Amount	*Percentage*	*Amount*	*Percentage*	*Percentage Increase*
A. Development Expenditure					
1. Education	1,40	6·8	3,54	7·4	
2. Medical and Public Health	68	3·3	1,40	2·9	
3. Agriculture, Veterinary and Cooperation	1,08	5·2	2,87	6·0	
4. Rural and Community Development	..	..	1,71	3·6	
5. Irrigation	7,64	37·0	6,50	13·5	
6. Electricity	1,96	9·5	5,00	10·4	
7. Road and Water Transport	3	0·1	9	0·2	
8. Civil Works	1,88	9·1	6,13	12·7	
9. Industrial Development	29	1·4	1,35	2·8	
10. Forest	33	1·6	65	1·4	
11. Miscellaneous[a]	22	1·1	94	1·9	
TOTAL (A)	15,51	75·1	20,18	62·8	94·6
B. Non-Development Expenditure					
12. Direct Demands on Revenue	48	2·3	65	1·4	
13. Civil Administration	3,33	16·1	4,71	9·8	
14. Interest Payment	30	2·4	3,75	7·8	
15. Repayment of Debt	36	1·7	3,78	7·8	
16. Famine	..	..	48	1·0	
17. State Trading	(−)8	(−)0·4	3,73	7·8	
18. Miscellaneous[b]	57	2·8	79	1·6	
TOTAL (B)	5,16	24·9	17,89	37·2	246·7
GRAND TOTAL (A)+(B)	20,67	100·0	48,07	100·0	132·6

[a] Includes labour, statistics, employment exchanges, etc.
[b] Includes stationery and printing, displaced persons, etc.

NOTE: The figures in this table will not necessarily tally with budget figures because of several adjustments.

TABLE 84

PROPOSED INVESTMENT BY CENTRE AND STATE GOVERNMENT AND THE PRIVATE SECTOR (1961–71)

(Rs. crores)

	Centre	*State*	*Private*	*Total*	*Percentage of Total*
1. Agriculture and Allied Activities	..	245·3	63·7	309·0	21·7
2. Factory Industry—Large and Small	450·0	9·0	102·1	561·1	39·3
3. Non-Factory Industry	..	4·5	7·2	11·7	0·8
4. Mining	25·0	10·0	22·1	57·1	4·0
5. Power	..	184·0	..	184·0	12·9
6. Tertiary	46·2	123·1	134·8	304·1	21·3
TOTAL	521·2	575·9	329·9	1427·0	100·0

NOTE: See Appendix 12 for the basis of investment proposals and allocations and the breakdown of tertiary investment.

TABLE 85

ALLOCATION OF INVESTMENT DURING 1951–61 AND 1961–71

Sector	*Investment 1951–61* (Rs. crores)	*Percentage of Total*	*Investment 1961–71* (Rs. crores)	*Percentage of Total*	*Percentage Increase in Investment of 1961–71 over Investment of 1951–61*
1. Agriculture, etc.	82·8	19·1	309·0	21·7	227
2. Factory Industry	234·1	53·8	561·1	39·3	144
3. Non-Factory Industry	8·9	2·0	11·7	0·8	31
4. Mining	13·4	3·0	57·1	4·0	326
5. Power	33·4	7·7	184·0	12·9	451
6. Transport and Communications	14·3	3·3	106·8	7·5	640
7. Public Health	3·3	0·8	27·2	1·9	769
8. Other Tertiary Activities	44·6	10·3	170·1	11·9	318
TOTAL	434·8	100·0	1427·0	100·0	228

NOTE: See tables 10 and 84 and for methods of estimation see Appendices 3 and 12.

TABLE 86

PROJECTED STATE INCOME (1960-61 AND 1970-71)

(Rs. crores)

Sector	*Income in 1960-61*	*Percentage Distribution*	*Income in 1970-71*	*Percentage Distribution*	*Additional Output in 1961–71*	*Percentage increase during 1961–71*	*Sectoral Origin of the Percentage Increase in Total Output*
1. Agriculture and Allied Activities							
(*a*) *Agriculture*	*164·74*	*44·2*	*271·76*	*30·3*	*107·02*	*65·0*	*28·7*
(*b*) *Animal Husbandry*	*14·43*	*3·9*	*18·47*	*2·1*	*4·04*	*28·0*	*1·1*
(*c*) *Forestry*	*6·97*	*1·9*	*13·50*	*1·5*	*6·53*	*109·4*	*1·8*
(*d*) *Fisheries*	*1·85*	*0·5*	*11·42*	*1·3*	*9·57*	*517·3*	*2·5*
TOTAL	187·99	50·5	315·15	35·2	127·16	67·6	34·1
2. Mining	8·98	2·4	42·22	4·7	33·24	370·2	8·9
3. Factory Enterprise	22·10	5·9	179·35	20·0	157·25	711·5	42·2
4. Power	3·36	0·9	21·76	2·4	18·40	547·6	4·9
5. Non-factory Enterprise	24·51	6·6	39·23	4·4	14·72	60·1	4·0
6. Construction	11·95	3·2	24·90	2·8	12·95	108·3	3·5
TOTAL	70·90	19·0	307·46	34·3	236·56	333·6	63·5
7. Transport and Communications	5·78	1·5	273·50	30·5	159·78	140·5	42·9
8. Trade and Commerce	43·74	11·7					
9. Other Services	49·81	13·4					
10. House Property	14·39	3·9					
TOTAL	113·72	30·5	273·50	30·5	159·78	140·5	42·9
TOTAL STATE INCOME	*372·61*	*100*	*896·11*	*100·0*	*523·50*	*140·0*	*140·5*
POPULATION (Million)	17·57		21·35				
PER CAPITA INCOME (Rs.)	212		420				

TABLE 87

PHASING OF LARGE SCALE INDUSTRIAL DEVELOPMENT

Period	*Investment* (Rs. crores)	*Value of Net Output* (Rs. crores)	*Employment* (Numbers)	*Power* (kW)
1961–66	137·45	61·415	37,080	269,150
1966–71	401·15	80·295	42,670	359,525

TABLE 88

ESTIMATES OF EMPLOYMENT AND LABOUR PRODUCTIVITY (1961 and 1971)

	1961		*1971*	
	Employment (Thousand)	*Net Output per Worker* (Rs.)	*Employment* (Thousand)	*Net Output per Worker* (Rs.)
Agriculture and Allied Activities	4954[a]	379	5175[a]	609
Factory Industry	79	2800	175	10,251
Non-factory Industry	430	570	525	747
Mining	82	1098	277	1523
Power	6	5670	38	5,737
Construction	199	600	350	711
Tertiary	1030	1103	1700	1,609
	6780[b]	550	8240[b]	1,087

[a] Employment in agriculture is residual.

[b] Total working force for 1961 and 1971 is estimated on the basis of 1951 participation ratio—38·6 per cent of the population.

TABLE 89

SHIFT IN THE SECTORAL DISTRIBUTION OF OUTPUT AND EMPLOYMENT (1961–71)

(Percentages)

	Net Output[a]		*Employment*[b]	
	1961	*1971*	*1961*	*1971*
Agriculture and Allied Activities	50·5	30·3	73·1	62·8
Factory Industry	5·9	20·0	1·2	2·1
Non-factory Industry	6·6	4·4	6·3	6·4
Mining	2·4	4·7	1·2	3·4
Power	0·9	2·4	0·1	0·5
Construction	3·2	2·8	2·9	4·2
Tertiary	30·5	30·5	15·2	20·6
	100·0	100·0	100·0	100·0

[a] *Vide* Table 86.

[b] *Vide* employment estimates for 1961 and 1971 presented in Table 66.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

CSL 28

Appendices

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

Appendix I

Composition of the Survey Team

Director-General

Dr. P. S. Lokanathan

Project Director

Mr. M. V. Divatia

Economists

Mr. I. Z. Bhatty
Mr. S. R. Bose
Dr. R. J. Chelliah
(Late) Dr. D. P. Khannapurkar
Dr. (Miss) Meenakshi Thiagarajan
Mr. M. Narayanaswamy
Mr. R. K. Patil
Mr. P. R. Rao
Dr. (Miss) P. Sen Gupta
Mr. R. S. Sharma
Mr. Vinod Dubey

Technical Officers

Dr. Ashok Singh
Mr. S. Balakrishna
Mr. M. K. Chatterjee
Mr. V. Kannan
Mr. H. S. Kulkarni

Consultants

Indian

Dr. B. N. Chopra
Mr. K. K. Kapani
Mr. V. K. Krishnaswami

Foreign

Mr. Lars C. Bratt
Mr. Paul Floyd
Mr. C. Karl Galetschky

Mr. Teru Sasaki

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

Appendix 2

State Income of Orissa, 1956-57—Methodological Notes

Agriculture

The outturn figures for all agricultural crops except rice for the years 1950-51 and 1956-57 are taken from *Area, Production and Average Yields of Principal Crops* published by the Ministry of Food and Agriculture. Rice outturn figures from the same source are not taken, as the State Government feel that they are very much on the side of under-estimation—a feeling which is confirmed by examination of findings of recent crop cutting and consumption surveys conducted in the State. The crop cutting surveys conducted by the State Government in 1959-60 showed that the average yield of rice per acre was around 776 lbs. as against the Ministry's figures for the earlier years which varied between 450 and 500 lbs., representing an under-estimation of 50 to 60 per cent. Hence the State Government's estimates of rice production in the State, derived mainly by applying the average yield differentials, are taken as a starting point.

2. These estimates are further checked with the estimates independently made on the basis of data relating to rice consumption in the State furnished by different consumption surveys conducted recently, to which the estimated net exports of rice from the State have been added. The estimates given here for both the years are thus the estimates of the State Government, with slight modifications which the "consumption" approach called for.

3. Gross output of agriculture in both the years is obtained by multiplying the outturn of principal crops with the corresponding State average prices in 1956-57. These prices are supplied by the Director of Agriculture, Government of Orissa. Gross value is netted at 14 per cent to provide for the value of seeds, manures and fertilizers and for depreciation of implements etc., on the basis indicated in the *National Income Committee (Final) Report, 1954*.

4. For crops for which only area figures are available, estimates of net output are made by using the figures of net output per acre of small millets. Net output for all crops estimated on these bases comes to Rs. 139·92 crores for 1950-51 and to Rs. 147·57 crores in 1956-57 at 1956-57 prices.

5. For 1960-61, the anticipated outturn of principal crops as given in the Draft Third Plan of Orissa Government is taken. The net output from farming in 1960-61 derived from the above comes to Rs. 164·74 crores at 1956-57 prices.

Livestock

6. Net output of livestock products for 1950-51 is obtained by estimating livestock population for 1950-51 from 1945 and 1957 Livestock Censuses, and applying to this estimate the ratios of different livestock products per unit of livestock population as derived from the 1957 Census, and the prices of livestock products prevalent in 1950-51. Deductions are made at the rate of

40 per cent of gross value. This gives a figure of Rs. 20·47 crores at 1950-51 prices. Livestock product prices are assumed to change with food-group index in the cost of living index. For Cuttack, this index was about 119 for 1950-51 and 107 for 1956-57, giving a fall of about 10 per cent from 1950-51. Income from livestock in 1950-51 at 1956-57 prices would, therefore, be 20·47 × 0·9 = Rs. 18·42 crores.

7. Estimate for 1956-57 is based on data collected in 1957 Livestock Census. Data for milk, ghee, butter and wool are taken from *Statistical Abstract of India, 1956-57.* Estimates of meat, eggs, poultry and hides and skins as also ratios of amount of products per unit of livestock of different types are derived from 1957 Census data. Dung output is taken at 88·7 maunds of dung per adult cattle per year and 44·4 maunds per young stock. Generally, average prices prevailing in 1956-57 are used. In some cases, however, estimates are made either by extrapolation or on the basis of prices prevailing in the neighbouring States. Gross values are netted by making a deduction of 40 per cent for feed costs and cost of materials and depreciation. The net output for 1956-57, on this basis, comes to Rs. 14·43 crores.

8. For 1960-61 the estimate is based on the assumption that during the Second Plan adequate measures would be taken to prevent further deterioration in livestock output. Thus the estimate for this year remains the same as for 1956-57, at that year's prices.

Forests

9. Net output for 1950-51 and 1956-57 is calculated from the data given below, after deducting 5 per cent for expenses from the gross values of major and minor forest products. Prices current in 1956-57 are used, so that 1950-51 net output is also expressed in terms of constant prices.

Year	*Timber*			*Bamboos*			*Firewood*			
	Output (Thousand Cft.)	*Price per Cft.* (Rs.)	*Gross Value* (Rs. crores)	*Output* (Thousands)	*Price per ton* (Rs.) (1 ton = 300 bamboos)	*Gross Value* (Rs. crores)	*Output* (Thousand Cft.)	*Price per Cft.* (Rs.)	*Gross Value* (Rs. crores)	*Producer Gross Value* (Rs. crores)
1950-51	10,533	3	3·16	91,914	50	1·532	15,092	0·50	0·75	0·308
1956-57	10,504	3	3·15	47,760	50	0·796	15,272	0·50	0·76	0·535

SOURCE: Output from Orissa Government's note and *Statistical Abstract, Orissa, 1957.* Price estimates by NCAER Expert on Forestry.

On the above basis gross values for 1950-51 and 1956-57 come to Rs. 5·75 crores and Rs. 5·24 crores respectively. Deducting 5 per cent from these values net output figure for 1950-51 comes to Rs. 5·46 crores and for 1956-57 to Rs. 4·98 crores, both at 1956-57 prices. For 1960-61 the estimate is highly tentative. It is based on the consideration that according to Government's estimates the revenue from forests is expected to increase from Rs. 1·895 crores in 1956-57 to Rs. 2·740 crores in 1959-60, i.e., by 44·5 per cent in 3 years or 14·8 per cent a year. In view of this it is assumed that the forest outturn will also increase by about 10 per cent a year or by 40 per cent over the four-year period, 1956-57 to 1960-61. Applying this rate of increase to net output figure for 1956-57, the estimate for 1960-61 (at 1956-57 prices) comes to 4·98 × 1·4 = Rs. 6·97 crores.

Fisheries

10. In 1950-51, according to 1951 Census, 44,054 persons were reported to be engaged in fishery industry in a professional way. According to National Income Committee Report, the average net income per person engaged in fishery came to Rs. 458 in 1950-51. For Orissa this income appears to be about 30 per cent less. A figure of Rs. 320 is, therefore, taken for Orissa. This gives an estimate of Rs. 1·40 crores as net income from this activity. It was raised by about 25 per cent to account for fish caught by non-professionals. The estimate thus comes to Rs. 1·75 crores. Further addition to this figure is made to account for net incomes of gatherers of shells, sponges, pearls, seaweeds, etc. Using the NIC proportion of this income to income from fishing, the total net income from fishing and allied activities for 1950-51 (at 1950-51 prices) comes to Rs. 1·78 crores. Fish prices in Orissa declined by about 10 per cent between 1950-51 and 1956-57 (*Orissa Statistical Abstract*, Table 166), the estimate for 1950-51 at 1956-57 prices, therefore, comes to 1·78 × 0·90 = Rs. 1·60 crores. For 1956-57 the estimate is obtained by raising the 1950-51 estimate by 10 per cent. This is the percentage by which fish output increased in India during 1950-56 (*Selected Plan Statistics*, 1959, Government of India). Estimate for 1956-57 (at 1956-57 prices) thus comes to 1·60 × 1·10 = Rs. 1·76 crores. No spectacular increase is expected between 1956-57 and 1960-61, and the rate of increase in fishing output may not be more than about 1 per cent per year or 4 to 5 per cent during this period. At this rate the estimate for 1960-61 (at 1956-57 prices) would be 1·76 × 1·05 = Rs. 1·85 crores.

Mining

11. Gross value[1] (at pit head price) of minerals produced in Orissa in 1950-51 comes to Rs. 3·65 crores and deducting 7 per cent (following NIC Report) for depreciation, etc., the net value comes to Rs. 3·32 crores. This is at 1950-51 prices. The Index of mineral prices (all-India) increased from 391 in 1950 to 531 in 1956, i.e., by about 36 per cent. The value of mineral output of 1950-51 in terms of 1956-57 prices would, therefore, be 3·32 × 1·36 = Rs. 4·52 crores. The estimate for 1956-57 based on data given in *Minerals Production in India* (1956 and 1957) comes to Rs. 6·40 crores. The value of output of three main minerals—iron ore, coal and manganese—was expected to increase by 140 per cent between 1955-56 and 1960-61. Applying this rate to total net output of minerals in 1956-57, valued at Rs. 6·40 crores, the probable estimate for 1960-61 at 1956-57 prices

$$6{\cdot}40 \times \frac{140}{100} = \text{Rs. } 8{\cdot}98 \text{ crores}$$

Large Scale (Factory) Industries

12. The general method of getting an estimate of net output of factory industries of Orissa in 1950-51 is to multiply the number of workers in each industry by average net value added per worker, as far as possible, for identical industry. Where estimates of net output per worker

---

[1] SOURCE: *Mineral Production in India*, 1956 and 1957.

GSL

for identical industries are not available, those relating to allied or related industries in Orissa or neighbouring States are generally used. In each case a deduction of 10 per cent is made from estimates in order to allow for miscellaneous expenses (e.g., advertising, bank charges, stationery costs, etc.) which are included in estimates of net output per worker, as derived from data given by *Census of Manufactures*. Data relating to number of workers are taken from Annual Report on Factories prepared by the Labour Department of the State Government, and those relating to net output per worker are derived from *Census of Manufactures* : *India*. The estimate for 1950-51 for factory industries, on the above basis, comes to Rs. 2·81 crores. This includes net output of electricity industry as well. As this industry is developing rapidly in Orissa, estimates relating to it are separated. In 1950-51, 5·1 million kWh of electricity was sold in Orissa. It is estimated that one kWh of electricity creates a net output of 4 nP. On this basis the net output of this industry in Orissa, for 1950-51, comes to 51 ×4=Rs. 2·04 lakhs, or say Rs. 2 lakhs. Deducting this figure from the output of factory industries, the estimate comes to Rs. 281−2 =Rs. 279 lakhs. The above estimates are in terms of 1950-51 prices. All-India wholesale price index for manufactured goods is used to reduce the estimate of output from factory industry to 1956-57 prices. The index for 1956-57 was about 10 per cent higher than that for 1950-51. Hence the estimate of factory net output in 1950-51 at 1956-57 prices comes to 2·79×1·1= Rs. 3·07 crores. For electricity industry no correction is made.

13. The method of estimation of net output of factory industries for 1956-57 was similar to that used for 1950-51. The figure including net output of electricity industry comes to Rs. 4·90 crores. The estimate for factory industry is separated by deducting from the total Rs. 6·3 lakhs for net output of electricity industry, obtained by multiplying 15·813 million kWh of power sold in 1956-57 by net output per kWh at the rate of 4 nP. Factory net output thus comes to Rs. 4·84 crores, and power estimate to Rs. 60,000, both in terms of 1956-57 prices.

14. During the Second Plan a number of large scale and heavy industries are being established in Orissa (e.g., steel, aluminium, ferro-manganese, cement, refractories, paper, sugar, fertilizers and heavy engineering). Power potential is also being created through the multipurpose projects. A number of new plants are likely to go into production in or before 1960-61. Table I of this Appendix gives details of output likely to materialize during 1960-61 or between 1956-57 and 1960-61. According to these estimates, which are based on expected output of individual plants, by 1960-61 Rs. 16·78 crores worth of new net output will materialize. The net output of factories in production during 1956-57 is also expected to expand at the rate of about 2·5 per cent per annum, i.e., at about the all-India rate (*Cf. Selected Plan Statistics*, Government of India, 1959). Thus factory net output in Orissa may well be expected to increase to Rs. 22·1 crores in 1960-61 from Rs. 4·84 crores in 1956-57, in terms of 1956-57 prices. The calculations are as follows:

(*a*) Annual rate of increase in net output from factories in production during 1956-57 is 2·5 per cent. Therefore, over four years, 1957-58 to 1960-61, increase would be 10 per cent, and total net output during 1960-61 from normal growth would be 4·84×1·1 =Rs. 5·324 crores.

(*b*) Estimated net output due to new plants coming into production between 1957-58 and 1960-61 would be Rs. 16·78 crores.

(*c*) Hence total factory net output in 1960-61 would be Rs. 5·324 crores+Rs. 16·78 crores =Rs. 22·104 crores or say Rs. 22·1 crores. (*See* Table I for details)

MINISTRY OF CULTURE · GOVERNMENT OF INDIA

GSL

15. Similarly, net output for power will also increase in a striking way by 1960-61. In 1960-61, the installed capacity in Orissa will be 280,000 kW. This would mean utilization of 840 million kWh of electricity at the rate of 3,000 kWh per kW of installed capacity. (Utilization factor in Orissa is likely to be high in view of power intensive steel plants and heavy industries being set up in the State.) The net output of electricity industry, in 1960-61, at the rate of 4 nP per kWh will, therefore, be Rs. 3·36 crores.

Small Scale and Cottage Industries (*excluding Construction*)

16. The general method of estimating net output of this sector for 1950-51 is to multiply the number of persons engaged in small scale and cottage industries in Orissa, by the estimate of net output per worker. The figures of workers in all manufacturing industries (excluding construction) are obtained from 1951 Census, and estimate of factory workers is deducted from these figures to get the working force engaged in this sector. Estimate of factory workers is made by correcting the daily average number of workers to account for non-reporting factories, and by adding 16 per cent to account for "other workers" and 12 per cent for absenteeism. Both self-supporting persons and earning dependents are included in the working force. On this basis the working force for this sector is estimated at 385,000. The NIC estimate for net output per worker in small enterprises comes to Rs. 800 (see *National Income Committee Report*, 1954, p. 108). In Orissa, the net output of factory workers is observed to be about 30 per cent less than the all-India average. Applying this reduction to all-India estimate of net output per worker in small enterprises, the probable estimate for Orissa for this category of workers in 1950-51 comes to 800 × 0·7 = Rs. 560 per worker, and aggregate net output for small scale and cottage industries comes to 385,000 × 560 = Rs. 21·56 crores. As bulk of these incomes is used for consumption purposes, and the cost of living index in Orissa registered a fall of about 7 per cent, from 116 in 1950-51 to about 108 in 1956-57, at 1956-57 prices the net output of small scale and cottage industries comes to 21·56 × 0·93 = Rs. 20·05 crores. Between 1950-51 and 1956-57 small scale and cottage industries do not appear to have experienced any significant growth. These are, therefore, assumed to have expanded at the rate of population growth in Orissa, i.e., by 1·8 per cent per annum or about 11 per cent during the six-year period.[1] On this basis net output for this sector in 1956-57 is estimated at 20·05 × 1·11 = Rs. 22·256 crores.

17. For 1960-61 estimates also small scale and cottage industries are assumed to grow at the rate of population growth (i.e., by 2 per cent per year or 8 per cent over the four-year period 1957-58 to 1960-61). On this basis income from this sector in 1960-61 would be Rs. 22·256 × 1·08 = 24·036 crores. Some addition to this estimate may be expected from net output likely to be created by the planned outlay of Rs. 1·55 crores during 1957-58 to 1960-61. Of this figure fixed capital may be about Rs. 95 lakhs, and this may create a net output of Rs. 47 lakhs or so on the basis of a capital-output ratio of 2 : 1. Aggregate income from small scale and cottage industries for 1960-61 may, therefore, be estimated at 24·036 + 0·47 = Rs. 24·506 crores.

Construction (*all types*)

18. In 1951, according to Census, some 49,000 workers were engaged in all kinds of construc-

---

[1] On the basis of the 1961 Census figures, it is estimated that the State's population increased at the average rate of 1·8 per cent per annum during 1951–56 and at 2 per cent per annum during 1957–61.

tion in Orissa. Net output per worker is taken at Rs. 560 on the basis of all-India average for small enterprises (Rs. 800) less 30 per cent to allow for lower wage level in Orissa. The estimate of net output of construction sector for 1950-51 thus comes to 49,000 × 560 = Rs. 2·74 crores. Since the cost of living index in Orissa was lower in 1956-57 by about 7 per cent, the estimate at 1956-57 prices comes to 2·47 × 0·93 = Rs. 2·55 crores. For 1956-57 net output of construction is assumed to have increased at the rate of population growth, i.e., by about 11 per cent. The estimate on this basis comes to Rs. 2·55 × 1·11 = Rs. 2·83 crores. In addition to this, in 1956-57, Rs. 1·98 crores of net product is estimated to have been created by construction activities of new large and heavy industries. The estimate is given in Table I of this Appendix. Moreover, out of the Second Plan expenditure of Rs. 10·87 crores during 1956-57, Rs. 8·56 crores were for construction. At one-third of this expenditure, the net output of Plan construction in 1956-57 comes to Rs. 2·85 crores. Total construction income for 1956-57 is thus estimated at Rs. 2·83 crores + Rs. 1·98 crores + Rs. 2·85 crores = Rs. 7·66 crores. The income from construction for 1960-61 was estimated as follows: Of the total investment in Orissa during 1957-58 to 1960-61 amounting to Rs. 341·18 crores, construction expenditure is estimated at Rs. 143·44 crores (42 per cent). At the rate of one-third of construction expenditure total net output due to construction over the four-year period comes to Rs. 47·81 crores. On the assumption that the construction expenditure is evenly distributed over these years the net income from construction in 1960-61 is Rs. 11·95 crores.

Transport and Communications

19. According to 1951 Census, there were 36,000 workers engaged in all forms of transport and communications in Orissa.[1] The *NIC Report, 1954* (p. 108), gives net output per worker in major transport at Rs. 1,600, and other forms of transport at Rs. 1,034. An average of Rs. 1,300 per worker is, therefore, assumed for Orissa. On this basis income from transport, etc., in 1950-51 is estimated at Rs. 4·68 crores (36,000 × Rs. 1,300). At 1956-57 prices, using the Cost of Living Index as deflator, this figure would come to 4·68 × 0·93 = Rs. 4·37 crores. During 1950-51 to 1956-57, the net output of all sectors (including construction) increased from Rs. 195·61 crores to Rs. 209·96 crores, i.e., by about 7·3 per cent. Transport output is assumed to have increased at the same rate. Thus for 1956-57, net output of transport sector comes to 4·37 × 1·073 = Rs. 4·69 crores.

20. Between 1956-57 and 1960-61, the output of production sectors is expected to go up from Rs. 209·96 crores to Rs. 258·89 crores, i.e., by about 23·3 per cent. During these years income

---

[1] Number of workers in Transport and Communications, 1951:

Categories	*No. of Workers*
1. Transport and Communications unclassified	1,226
2. Transport by Road	11,898
3. Transport by Water	3,433
4. Transport by Air	52
5. Transport by Railway	13,374
6. Storage	1,468
7. Postal Services	4,046
8. Telegraphs	126
9. Telephone	261
10. Wireless	270
TOTAL	*36,254*

from transport and communications is also assumed to go up at the same rate. On this basis income from transport sector is estimated at $4{\cdot}69 \times 1{\cdot}233 =$ Rs. 5·78 crores.

Trade and Commerce

21. According to 1951 Census, there were 237,000 persons engaged in trade and commerce in Orissa. Net output per worker in this sector is estimated at Rs. 1,500, on the basis of *NIC Report, 1954* (pp. 82 and 108). The estimate for 1950-51 thus comes to Rs. 35·55 crores. Applying 7 per cent fall in the cost of living index between 1950-51 and 1956-57, at 1956-57 prices this figure would come to Rs. 33·06 crores. Estimate for 1956-57 is obtained by applying 7·3 per cent increase in net output of production sectors during 1950-51 to 1956-57 to the estimate of income from trade and commerce for 1950-51. Estimate for 1956-57 on this basis comes to Rs. 35·47 crores. Again applying 23·3 per cent increase in output of production sectors from 1956-57 to 1960-61, the estimate of net output of trade and commerce for 1960-61 comes to Rs. 43·74 crores.

Other Services

22. According to 1951 Census, 733,650 persons[1] were engaged in other services (professions, Government service, domestic services, etc.). Net output per worker is taken, on an average at Rs. 608 on the basis of Rs. 600 for professions and liberal arts, Rs. 1,100 for Government servants and Rs. 400 for domestic servants. On this basis estimate for this sector comes to Rs. 44·676 crores. Allowing for price fall of 7 per cent between 1950-51 and 1956-57, estimate for 1950-51 in terms of 1956-57 prices comes to Rs. 41·549 crores. For 1956-57 net income of this sector is assumed to have increased at the rate of population growth, i.e., by 11 per cent during 1950-51 to 1956-57. Again, income from other services is assumed to have increased by 8 per cent during 1956-57 to 1960-61. On this basis estimate for 1956-57 comes to $41{\cdot}5 \times 1{\cdot}1 =$ Rs. 46·12 crores, and for 1960-61, $47{\cdot}78 \times 1{\cdot}08 = 49{\cdot}81$ crores.

House Property

23. According to 1951 Census, the number of houses in Orissa was 0·12 million in urban areas and 2·89 million in rural areas. According to *NIC Report (1954)*, the average net rental income from rural housing in 1950-51 was estimated at Rs. 36 per house. The estimate for urban income from house property comes to Rs. 209·4 per house. These averages are assumed to hold good for Orissa also. On this basis rural income from house property comes to Rs. 10·4 crores. The urban income is estimated at Rs. 2·51 crores and therefore, total income from this sector is estimated at Rs. 12·91 crores, for 1950-51. Applying 7 per cent fall in cost of living index in Orissa between 1950-51 and 1956-57 to this estimate, income from house property for the year 1950-51, in terms of 1956-57 prices, comes to Rs. $12{\cdot}91 \times 0{\cdot}93 =$ Rs. 12·0 crores.

24. This income is assumed to have increased at the rate of population growth rate during 1950-51 to 1956-57 (i.e., by 11·0 per cent over the period). On this basis the estimate of house property income for 1956-57 in the same year's prices comes to Rs. 13·32 crores ($12 \times 1{\cdot}11 = 13{\cdot}32$).

---

[1] This figure excludes beggars, prisoners, inmates of jails, etc.

25. The estimate for 1960-61 is made by applying the estimated population growth rate of 2 per cent per year during the period 1957-58 to 1960-61. The total increase over the 4 years from 1956-57 to 1960-61 would thus be 8 per cent and the income from house property in 1960-61, on this basis, comes to Rs. 14·39 crores (13·32 × 1·08 = 14·39).

CSL

TABLE I

ESTIMATE OF NET OUTPUT DUE TO INDUSTRIAL CONSTRUCTION AND PRODUCTION (1956-57 AND 1960-61)

(Relates to major industries licensed during Second Plan)

Industry	*Capacity per Annum* (tons)	*Investment (fixed)* (Rs. crores)	*Net Product of Construction (at one-third of cost)* (Rs. crores)		*Net Product of Industry* (Rs. crores)	
			1956-57	*1960-61*	*1956-57*	*1960-61*
1. Steel Plant (Rourkela)	1,000,000	145·50[a]	1·425 (9·5%)[b]	1·500 (10%)[b]	..	6·25
2. Aluminium Plant (Hirakud)	20,000	15·00	0·100 (10%)	0·100 (10%)	..	1·95
3. Ferro-Manganese Plant (Joda)	30,000	1·75	0·053 (50%)	..	..	1·35
4. Ferro-Manganese Plant (Raigada)	12,000	0·70	0·020 (40%)	..	..	0·54
5. Cement	725,000 (total)	2·80	..	0·120 (50%)	0·66	1·46
6. Refractory (Orissa Cement)	88,000	2·00	0·120 (50%)	..	..	0·97
7. Refractories (Belpahar)	60,000	3·60	0·232 (60%)	..	..	0·66
8. Refractories (Orissa Industries)	46,000	1·10	..	..	0·51	0·51
9. Paper (Expansion)	14,000 (additional)	3·00	0·020 (50%)	..	..	0·84
10. Paper (New)	12,000	3·50	..	..	..	0·42
11. Paper (Straw Product Ltd.)	18,000	5·50	..	0·140 (20%)	..	..
12. Sugar (Expansion)	30,000 (cane)	1·40	..	..	..	0·15
13. Sugar (Aska Coop. Industry)	120,000 (cane)	1·35	..	0·090 (50%)	..	0·30
14. Low Shaft Furnace (Pig Iron)	30,000	0·50	0·010 (30%)	..	..	0·38
15. Kaling Tube (Expansion)	40,000	0·60	..	0·020 (30%)	..	1·00
16. Larsen & Toubro (Machinery)	6,000	2·50	..	0·080 (50%)	..	..
17. Steel Structural	20,000	2·00	..	0·070 (50%)	..	..
18. Fertilizers	340,000 (Nitro Chalk)	..	..	0·850 (30%)	..	..
		217·80	1·980	2·970	1·17	16·78

[a] Rs. 4·5 crores is estimated to have been invested in construction expenditure in Rourkela Steel Plant in 1955-56.

[b] Figures in bracket indicate the percentage of the total construction expenditure which is estimated to have been increased in the year in question and from which the estimate of net output is derived at the rate of two-thirds of the expenditure.

Appendix 3

Estimate of Investment in Orissa[1]

(1950-51 to 1956-57 and 1957-58 to 1960-61)

Agriculture

Total State Plan expenditure in the First Plan on agricultural development was Rs. 2·7 crores and the investment component of it is estimated to be Rs. 81 lakhs at 30 per cent of the outlay. Expenditure on irrigation projects of the State Government was Rs. 2·6 crores, all of which is investment. Investment component of Rs. 2·7 crores spent on Community Development in the First Plan is estimated to be Rs. 1·14 crores. Hirakud Stage I, a central multipurpose project, absorbed an expenditure of Rs. 45 crores, and investment on irrigation development is estimated at 61 per cent of total expenditure,[2] to be Rs. 27·45 crores. Actual investment expenditure incurred under above heads in 1956-57 was Agricultural Development Rs. 85 lakhs, Community Development Rs. 61 lakhs[3], State Irrigation projects Rs. 51 lakhs, and Hirakud Stage I spill-over 61 per cent of Rs. 6·98 crores, i.e., Rs. 4·25 crores. According to NSS 3rd round data, about Rs. 1·4 per year were invested in agriculture per person in rural areas in East India during 1950-51. On this basis the total investment by farmers in six years is estimated at Rs. 11·76 crores (1·4 × 14 × 6). Investment in Agricultural Sector during 1950-51 to 1956-57 would therefore come to:

(Rs. crores)

	1950-51 to 1955-56	*1956-57*	*1950-51 to 1956-57*
Agricultural and Allied Development	0·81	0·85	1·66
Community Development	1·14	0·61	1·75
State Irrigation Projects	2·60	0·51	3·11
Hirakud Stage I	27·45	4·25	31·70
Personal Investment by Farmers	9·80	1·96	11·76
TOTAL	*41·80*	*8·18*	*49·98*

---

[1] Sources used are:
First and Second Five Year Plans of Orissa;
First and Second Five Year Plans (All-India);
Planning Commission Notes. Re: Preliminary Study of Economic Development of Orissa (mimeographed);
National Sample Survey Report No. 3, Third Round (August–November, 1951);
Planning Commission: Govt. of India;
State Development Plans: Review of Progress, 1958;
Planning Commission: *Review of First Five Year Plan*, May 1957.

[2] See the method of allocation discussed in para 10 of this Chapter.

[3] Calculated on the basis of ratio (0·473) of investment to total outlay during the First Five Year Plan on Community Project Schemes.

2. During the Second Plan anticipated expenditure on development in the Agricultural sector (i.e., cultivation, livestock, forests and fisheries) is estimated by the Planning Commission at Rs. 9·9 crores. Investment component of this outlay at 30 per cent would be Rs. 2·97 crores. Of this, investment of the order of Rs. 85 lakhs took place in 1956-57. Hence the estimates for 1957-58 to 1960-61 would be Rs. 2·12 crores. Anticipated expenditure on Community Development during the Second Plan is placed at Rs. 5·985 crores. Out of this amount Rs. 1·29 crores was actual expenditure in 1956-57. Rs. 4·695 crores may therefore be attributed to the period 1957-58 to 1960-61. At least 40 per cent (during the First Plan period it was 47·3 per cent) of this amount would go into asset creation (i.e., irrigation, roads, wells, school buildings, etc.). Investment component of this outlay would therefore be Rs. 1·88 crores during 1957-58 to 1960-61. (An equal amount may be expected to go into investment by way of people's participation.) This amount (i.e., Rs. 1·88 crores) may be attributed to the period 1957-58 to 1960-61. Anticipated expenditure on State Irrigation projects in the Second Plan is estimated at Rs. 11 crores, of which Rs. 51 lakhs was the actual expenditure in 1956-57, leaving the balance of Rs. 10·49 crores for the period 1957-58 to 1960-61. The whole of this amount is taken as investment.

3. In the Second Plan anticipated expenditure on Hirakud Stage I spill-over and Stage II is estimated at Rs. 25·1 crores. Deducting the actual expenditure of Rs. 7·84 crores during 1956-57, the estimate of outlay for 1957-58 to 1960-61 comes to Rs. 17·26 crores. Taking 61 per cent of this as investment on irrigation, the estimate of investment during the latter period under this head comes to Rs. 10·53 crores.

4. From the NSS 3rd round data it would appear that in 1950-51, in the rural areas of East India, about Rs. 1·4 per head per year were invested in land improvement, agricultural implements and other improvements excluding housing. Rural population of 14 million is therefore estimated to have invested Rs. 1·96 crores a year in agriculture. On the assumption that this amount normally gets invested in agriculture annually through the farmers' personal efforts and resources, private investment in agriculture during 1950-51 to 1956-57 is estimated at Rs. 11·76 crores (as mentioned earlier) and Rs. 7·84 crores during 1957-58 to 1960-61.

5. On the above basis estimates of investment in Agricultural sector during 1957-58 to 1960-61 would be as follows:

	(Rs. crores)
Agricultural Development	2·12
Community Development : State Plan	1·88
State Irrigation Projects	10·49
Hirakud Stage I (spill-over) and Stage II	10·53
Personal Investment by Farmers	7·84
TOTAL	*32·86*

6. On the above basis the breakdown of public and private investment in Agricultural sector during the two periods would be:

(Rs. crores)

Periods	*Public Sector*			*Private Sector*	*Grand Total*
	Centre	*State*	*Total*		
1950-51 to 1956-57	31·70[a]	6·52	38·22	11·76	49·98
1957-58 to 1960-61	..	25·02	25·02	7·84	32·86

[a] Hirakud expenditure is taken as Central investment in the First Plan and State investment in the Second Plan.

Mining

7. Direct estimates of investment in mining are not feasible. Hence a capital-output ratio of 3 : 1 is applied to increments in net output of mining sector during 1950-51 to 1956-57 and 1957-58 to 1960-61. Incremental capital-output ratio for India's mining industry is estimated at 4 : 1 by the M.I.T. India Project.[1] For Orissa, in view of the large output of iron ore and manganese for which open cast mining is practised, a lower ratio (3 : 1) has been adopted. Increments of net output of mining industry during the two periods were Rs. 1·88 crores and Rs. 2·58 crores respectively, giving estimates of additional investment at Rs. 5·64 crores in 1950-51 to 1956-57 and Rs. 7·74 crores in 1957-58 to 1960-61. There was little of public investment in the First Plan, but during the Second Plan Orissa Mining Corporation came into being with a total capital of Rs. 50 lakhs in which the State Government has invested Rs. 25 lakhs and the Central Government another Rs. 25 lakhs. Investment in mining industry during the two periods is therefore estimated as follows:

(Rs. lakhs)

	Public Sector				
Period	*Centre*	*State*	*Total*	*Private Sector*	*Grand Total*
1950-51 to 1956-57	..	..	..	564	564
1957-58 to 1960-61	25	25	50	724	774

Factory Industries

8. Between 1950-51 and 1956-57 the following new investment in major industries is estimated to have taken place:

(Rs. lakhs)

	Private Sector	*State Government*	*Total*
1. Orissa Textiles	1,10	40	1,50
2. Orissa Cement	60	90	1,50
3. Orient Paper Mill	5,00	..	5,00
4. Two Sugar Mills	1,50	..	1,50
5. Kalinga Tubes Ltd.	40	10	50
6. Caustic Soda Plant	20	..	20
TOTAL	8,80	1,40	10,20
Net increase in fixed capital according to CMI (1950-1956)	1,60	..	1,60
GRAND TOTAL	*10,40*	*1,40*	*11,80*

9. In addition, an investment of Rs. 4·5 crores is deemed to have taken place in 1956-57 as construction outlay on Rourkela Steel Plant, bringing the total investment during this period to Rs. 16·3 crores. During 1957-58 to 1960-61, the investment in major new industries is very large. As estimated in Table I of Appendix 2, this investment comes to Rs. 217·8 crores. Of this amount, Rs. 145·5 crores is Central Government investment in the Rourkela Steel Plant,

---

[1] Benjamin Higgins: *Economic Development, 1959* (Norton N.Y., U.S.A.), p. 646.

and the balance largely comes from the private sector. In the Second Plan, State Government provided a sum of Rs. 115·5 lakhs for assistance to new industries, of which Rs. 32 lakhs are expected to have been used in 1956-57. The balance of Rs. 83·5 lakhs would, therefore, be available during 1957-58 to 1960-61. The investment position in regard to major factory industries would, therefore, be as follows:

(Rs. crores)

	Public Sector			*Private*	*Grand*
Period	*Centre*	*State*	*Total*	*Sector*	*Total*
1950-51 to 1956-57	4·50	1·40	5·90	10·40	16·30
1957-58 to 1960-61	145·5	0·84	146·34	71·46	217·80

Power

10. Investment estimates for both the periods (i.e., 1950-51 to 1956-57 and 1957-58 to 1960-61) are made by applying a capital-output ratio of 10 : 1 to the estimate of incremental net output in power section during these periods. The source for the estimate of the ratio is the same as stated in para 7 above. The ratio appears to be reasonable as under Indian conditions. The average investment per kW of installed capacity would be between Rs. 1,200–1,500 and the net output per kW at 4 nP per kWh and 3,000 kWh utilization per kW would come to Rs. 120, giving an average ratio of a little more than 10 : 1. Incremental net output in the two periods would be Rs. 4 lakhs and Rs. 3·30 crores respectively (see table and notes on State Income) and the investment estimates for power sector would be Rs. 40 lakhs and Rs. 33 crores respectively. Total cost of Hirakud Stage I is estimated at Rs. 85·7 crores. Out of this amount Rs. 33·40 crores should be allocated to investments in power development and Rs. 52·30 crores to irrigation development (i.e., 39 per cent to power and 61 per cent to irrigation).

Small Scale and Cottage Industries

11. A capital-output ratio of 2 : 1 is used for both the periods 1950-51 to 1956-57 and 1957-58 to 1960-61. The source is the same as given in para 7 above. Increments in net output as estimated in the note on State Income are Rs. 2·19 crores for 1950-51 to 1956-57 and Rs. 2·27 crores for 1957-58 to 1960-61. On the basis of capital-output ratio of 2 : 1, investment for first period is estimated at Rs. 4·38 crores and for second period, at Rs. 4·54 crores. Investment component of State Plan outlay on small scale and cottage industries in the First Plan was Rs. 63 lakhs and the actual expenditure of a capital nature in 1956-57 was Rs. 11 lakhs and thus giving a total of Rs. 74 lakhs as State Government's investment for 1950-51 to 1956-57.

12. Investment component of Second Plan expenditure during 1957-58 to 1960-61 is estimated at Rs. 95 lakhs, thus giving a figure of Rs. 3·59 crores (Rs. 4·54 crores *minus* Rs. 0·95 crores) as private investment in this sector in the period. The position is summarized in the table below:

INVESTMENT ON SMALL SCALE AND COTTAGE INDUSTRIES

(Rs. lakhs)

	Public Sector			*Private*	*Grand*
Period	*Centre*	*State*	*Total*	*Sector*	*Total*
1950-51 to 1956-57	..	74	74	364	438
1957-58 to 1960-61	..	95	95	359	454

House Property

13. A capital-output ratio of 17 : 1 is applied to increments of income from house property in each of the periods. The ratio is based on the assumption that average net rental of a house is 6 per cent of the original value of the property. Increment of income in the first period is estimated at Rs. 1·32 crores and in the second period at Rs. 1·07 crores. On the basis of a ratio of 17 : 1 the investments in the two periods are placed at Rs. 22·42 crores and Rs. 18·19 crores respectively. Out of this, State Government investment in housing including expenditure on new capital during the first period is estimated at Rs. 49 lakhs and during the second period at Rs. 2·74 crores.

Transport and Communications

14. Increments of income for 1950-51 to 1956-57 and 1957-58 to 1960-61 are estimated at Rs. 32 lakhs and Rs. 109 lakhs respectively. Investment is estimated by applying a capital-output ratio of 5 : 1. This ratio is taken from source given in para 7 above. On this basis the estimates for the two periods come to Rs. 1·60 crores and Rs. 5·45 crores respectively. These figures relate to investment in transport vehicles, rolling stock, etc. Out of this, about Rs. 15 lakhs were invested in nationalized transport sector in 1956-57 and Rs. 70 lakhs is the estimated investment in this sector during 1957-58 to 1960-61. In addition to this Rs. 2·7 crores were invested in roads in the First Plan and Rs. 1·35 crores in 1956-57. Estimated investment in roads during 1957-58 to 1960-61 would be Rs. 3·18 crores. A rough break-down between Centre, State and private sector would be as follows:

(Rs. crores)

Period	*Public Sector*			*Private Sector*	*Total*
	Centre	*State*	*Total*		
1950-51 to 1956-57			4·20	1·45	5·65
1957-58 to 1960-61			3·88	4·75	8·63
TOTAL			*8·08*	*6·20*	*14·28*

Education

15. Total expenditure in the First Plan was Rs. 1·5 crores and in 1956-57, Rs. 75 lakhs. Estimates for 1957-58 to 1960-61 is placed at Rs. 4·55 crores. About 25 per cent of these figures would represent investment component, mostly construction expenditure. Thus investment estimates for the two periods would be:

1950-51 to 1956-57	Rs. 56 lakhs
1957-58 to 1960-61	Rs. 116 lakhs

The entire amount would be in the State sector.

Health and Rural Water Supply

16. Expenditure in the First Plan was Rs. 1·5 crores and in 1956-57, Rs. 25 lakhs. Estimate for 1957-58 to 1960-61 is Rs. 3·25 crores. About 65 per cent of this is investment component,

because of inclusion of rural water supply schemes. Investment under Health Schemes would, therefore, be:

1950-51 to 1956-57	Rs. 1·14 crores
1957-58 to 1960-61	Rs. 2·14 crores

The whole amount would be in the State sector.

Welfare of Backward Classes

17. Expenditure in the First Plan was Rs. 1·5 crores, and in 1956-57, Rs. 55 lakhs. Estimates for 1957-58 to 1960-61 is Rs. 2·75 crores. Investment component is 33 per cent. Thus investment estimates for the two periods are:

1950-51 to 1956-57	Rs. 68 lakhs
1957-58 to 1960-61	Rs. 98 lakhs

The entire investment is in the State sector.

Trade and Commerce

17. A capital coefficient of 0·05 is applied to increment of income in two periods. The source given in para 7 cites USA coefficient at 0·1 or less. For Orissa the ratio would be low owing to backwardness of the State economy; 0·05 is therefore taken as the coefficient. On this basis the investment estimates come to Rs. 22 lakhs for 1950-51 to 1956-57 and Rs. 41 lakhs for 1957-58 to 1960-61. (Income increments for the two periods are estimated at Rs. 2·41 crores and Rs. 8·27 crores respectively.) The bulk of this investment would be in construction of shops and godowns, etc.

18. The aggregate investment estimates and their breakdown between Centre, State and private sectors would be as given in Table 9.

GSL

Appendix 4

A Note on Agricultural Statistics in Orissa

Agricultural statistics in Orissa are defective both in their coverage and reliability. In 1955-56 the reporting area covered only about 80 per cent of the total geographical area. This percentage was as low as 24 per cent for Koraput and 47 per cent for Ganjam district.

2. Statistics in Orissa are supposed to be compiled by a field-to-field enumeration at the primary level. But there are large areas—specially the former princely States which have not been cadastrally surveyed. This affects the reliability of the statistics, as in the absence of a village map showing boundaries of each field, it is not possible to record statistics correctly.

3. The method of collecting statistics is not uniform all over the State. In Koraput and Ganjam districts the primary collecting agency is the *Karnam*; in Cuttack, Balasore and Puri districts, it is the *Chakla Kanungo*, and in Sambalpur it is the *Pauwali*. It is suggested that the primary reporting agency in Orissa should be set up in the entire State on the same lines as in other States, and provision should be made for their training.

4. Recently crop cutting experiments have been made in Orissa which show that the average yield of rice is much higher than what was reported according to eye-estimates. Crop cutting experiments should be carried out for all the crops in order to estimate the average yields.

5. There is very little information available at present on the economic aspects of agriculture such as cost of production, the economics of irrigation, and the regional distribution of commercial crops. Such information can be collected by the Department of Agriculture, in which an economic and statistical section may be created.

GSL

Appendix 5

A Note on the Programme for Extending Irrigation Facilities

An attempt is made here to illustrate the significance of some other factors that are relevant to a programme for extending irrigation facilities. The general approach is to take the volume of water made available by a specific project as given, and then to consider various alternative ways of utilizing it, with a view to discovering the most desirable pattern of utilization from the economic standpoint. Moreover, given the cost of a number of irrigation projects, the result of optimum utilization of each of these can be compared to choose the most productive scheme.

2. The estimates of irrigation potential in the State do not clearly distinguish between the irrigation potential determined on technical grounds and that determined by economic considerations. A given irrigation project can technically irrigate a certain maximum acreage determined by the water available and physiography. This technically determined maximum sets a limit to the economical irrigation potential. Given the volume of water made available by a project, the area irrigated will vary with the crops grown, which decides the intensity with which irrigation water is utilized. The economically desirable cropping pattern is the one which yields the maximum increase in output. With this cropping pattern, the available water can be spread over a certain area, which cannot be larger than the technically determined maximum irrigable area, but which might very well be smaller.

3. The desirable cropping pattern can be determined only by comparing the 'productivity' of various alternative patterns that can be adopted, given the water made available, and the maximum area that can be technically irrigated by the irrigation projects. The estimates of the irrigation department given in the text use an arbitrarily selected cropping pattern for determining the irrigation potential. If the cropping pattern is varied the estimates of irrigation potential will also change.

4. The data used are from the "Irrigation Potential of Orissa" (Major and Medium Projects) by the State Irrigation Department. The data available do not allow the consideration of all the factors relevant to the problem. The analysis is, therefore, carried out under very restrictive assumptions and is mainly illustrative rather than conclusive in content. Some of the limitations become obvious in the assumptions, and others are listed later.

5. The procedure is, briefly, to determine the water requirements of some crops in the conditions prevailing in Orissa, and, selecting a few sample cropping patterns, to calculate the increase in agricultural production that follows from the utilization of the given volume of water made available by an irrigation project.

6. According to the irrigation department figures one acre of rice requires 59·6 acre inches of water as compared to 120 acre inches required by sugarcane and 9 acre inches by cash and light rabi crops.[1]

---

[1] These are not specified in the Irrigation Department report but may be taken to be oilseeds, pulses, and millets and other cereals.

7. These requirements may be met by rainfall or by irrigation. In Orissa, about 85 per cent of the rain falls between June and October. For the calculation (Table I) it is assumed that all the rainfall is concentrated during these months, the rain during the rest of the year being supposed to be not significant enough to affect water requirements. Of the rainfall during the monsoon season only 75 per cent is assumed to be "useful" to the crop. Thus if the annual rainfall is 65 inches, the rainfall from June to October is 60 inches, then "useful"rainfall is 45 inches. The difference between water requirement of a crop and the "useful" rainfall during the period is the amount of water required by irrigation. This amount is raised by 25 per cent, to allow for wastage and seepage, to arrive at the total requirements of irrigation water for the crop.

8. The deltas for each crop (*see* Table I) indicate the acre feet of irrigation water required by one acre of crop calculated as indicated above. The deltas for cash and light rabi crops, and for rabi rice are the same for all river basins because it has been assumed that all the useful rainfall is from June to October so that all the water requirement of the crop has to be met by irrigation.

9. The net area that can be irrigated with a given amount of water will vary according to the cropping pattern adopted and the proportion of irrigated land that is double cropped.

10. In Table I, four cropping patterns are distinguished on the basis of crops grown and the proportion of double cropped area. Pattern I involves the calculation of kharif rice and of cash crops and light crops in the rabi season and a gross irrigated area 40 per cent higher than the net irrigated area. Pattern II combines kharif rice with rabi rice, the proportion of rabi to kharif being again 40 per cent. In Pattern III the ratio of rabi to kharif is still 40 per cent, the kharif crop is rice but one-fourth of the irrigated rabi area is under rice and the rest under cash and light crops (like pulses, millets and oilseeds). Pattern IV combines kharif rice with rabi rice, but the irrigated area in the kharif season is the same as that in Pattern I, the rabi irrigated area being 6 per cent instead of 40 per cent of the kharif area.

11. In calculating production with Patterns I and II the yield per acre is initially taken as the average of the yields during 1951-56—515 lbs. an acre for rice and 400 lbs. per acre for light rabi. Subsequently, a differential between yields per acre of irrigated and non-irrigated rice is introduced. Non-irrigated yields of rice are assumed to be equal to the average yield during 1951-56 while the yield of irrigated rice is assumed to be 19 tons per acre higher.[1] This implies that yields of irrigated rice are about 83 per cent higher than the average yield during 1951-56. No increase in the yield per acre of light rabi crops over 1951-56 average is assumed due to lack of data.

12. All the calculations are made separately for each of the eight river basins. For comparing the alternative cropping pattern the aggregate area and production figures calculated are given below in Table II.

13. Since the total irrigated area varies, the production figures as they stand cannot be used to compare the alternative patterns of utilizing a given amount of irrigation water, unless we assume that no agricultural production whatever is possible on non-irrigated land. But this assumption cannot be made for Orissa where the rainfall is high enough for a kharif crop of rice to be grown without irrigation. Before comparing the productivity of the various patterns, therefore, the total production on the area irrigated must be reduced by the production on the

---

[1] This is the additional production of foodgrains per acre in Orissa flowing from irrigation as estimated by the Planning Commission.

TABLE I

THE INTER-RELATION BETWEEN WATER REQUIREMENTS, CROPPING PATTERNS AND IRRIGATED AREA IN ORISSA

River Basin (1)	*Proposed Utilization of Water* (Million acre feet) (2)	*"Useful" Rainfall* (inches) (3)	*Delta for Kharif Rice* (feet) (4)	*Delta for Rabi Rice* (feet) (5)	*Delta for Cash Crops and Light Rabi* (feet) (6)	*Net Area Irrigated Cropping Pattern I* (Thousand acres) (7)	*Net Area Irrigated Pattern II* (Thousand tons) (8)	*Pattern I, Total Production from Irrigated Area Yields per Acre Unchanged* (Thousand acres) (9)	*Pattern II Total Production from Irrigated Area only Yields per Acre Unchanged Rice* (Thousand tons) (10)	*Total Production Pattern I increased Productivity estimated Rice* (11)	*Total Production Pattern II Increased Productivity of Irrigated Rice* (12)	*Net Area Irrigated Pattern III* (Thousand acres) (13)	*Total Production from Irrigated Land: Rice+Light Rabi* (Thousand tons) (14)	*Net Area Irrigated Pattern IV* (Thousand acres) (15)	*Total Production from Irrigated Area—Pattern IV Kharif Rice+Rabi Rice* (Thousand tons) (16)
								Rice Cash and Light Rabi							
1. Subarnrekha	2·344	35·3	2·50	6·2	·94	810	470	184 + 57	150	3·37	2·75	700	322	+ 810	337 + 21·2
2. Burhabalang	0·587	38·86	2·16	6·2	·94	230	126	52 + 16	40	·95	·73	190	87	+ 230	95 + 6·0
3. Baitarni	1·3789	34·17	2·65	6·2	·94	450	270	101 + 32	86	1·85	1·57	390	179	+ 450	185 + 12·5
4. Brahmani	3·8589	37·78	2·27	6·2	·94	1450	810	330 + 103	259	6·05	4·74	1210	556	+1450	605 + 38·0
5. Mahanadi	3·0591	36·76	2·38	6·2	·94	1110	630	253 + 79	201	4·63	3·68	930	428	+1110	463 + 27·9
6. Rushikulya	0·0179	30·54	3·08	6·2	·94	5	3	1 + 0·3	1	0·18	·018	4	2	+ 5	1·8 + 0·16
7. Vamsadhara	0·3084	31·50	2·92	6·2	·94	90	57	20 + 6	1·8	·37	·33	80	37	+ 90	37 + 3·1
8. Godavari	1·7667	32·93	2·76	6·2	·94	560	340	128 + 50	108	2·35	1·98	480	221	+ 560	235 + 18·8
TOTAL	13·300					4705	2706	1069 + 334	863	19·6 light rabi	+15·5	3984	1842 212	+4705	1965 +124·0

CSL

Notes:

2. This is the amount of water proposed to be utilized by 51 major and medium projects distributed among the river basins, according to report of the Irrigation Department.

3. This is 75 per cent of the rainfall in the monsoon months, June to October in the river basins. Since over 80 per cent of the annual rainfall is concentrated in the monsoon months this assumption was made.

4, 5 and 6. The Delta calculations are made on the figures of water requirements given by the Irrigation Department 59·6″ for rice 9″ for light rabi. The calculations assume that all the useful rainfall is concentrated in the monsoon months, so that rabi crop must depend solely on irrigation water. An addition of 25 per cent is made to the water requirement to allow for wastage, seepage, etc.

7. Cropping pattern I implies that gross irrigated area is 40 per cent larger than net irrigated area, i.e., double cropping of 40 per cent, and that kharif rice and light rabi crops are grown.

8. Pattern II has the same percentage of double cropping, the kharif crop is rice and the rabi crop is also rice.

9 and 10. The production is calculated on the assumption of 1951–56 yields per acre. Rice yield=510 lbs. per acre. The average yield of pulses during these years was 276 lbs. per acre, of oilseeds 4 lbs. and of millets and other cereals 49 lbs. per acre. The average yield of light rabi crops has been taken as 400 lbs. per acre.

11 and 12. Allowance is made for increased yields: production of rice is supposed to increase by 0·19 tons per acre with irrigation (Planning Commission, yardstick for additional production of foodgrains for Orissa).

13 and 14. Pattern III has 40 per cent double cropping, but kharif rice is combined with rice and light rabi crops. The 40 per cent of the net irrigated area that is double cropped, is devoted to rice and light rabi in the ratio 1 : 3.

15 and 16. Pattern IV has the same area under kharif rice under irrigation as pattern I, but the rest of the available water is used for rabi rice. The net irrigated area is the same as pattern I, but the irrigated area under rabi is only 6 per cent of the net irrigated area. The yield per acre of irrigated rice is still assumed to be 0·19 ton higher than the 1951–56 average yield.

Source: Data for Columns 2, 3, 4, 6, from the Report on Irrigation Potential, Department of Irrigation, Orissa.

same area without irrigation. Assuming that all the land irrigated in the different patterns would be able to grow a kharif crop of rice without irrigation, the gross increment in agricultural output due to irrigation can be determined. (Table III)

14. The value of the increase in agricultural production is estimated by using 1954-55 prices. The price of light rabi crops is taken to be the weighted average of the 1954-55 prices of ragi, maize, gram, rape and mustard, linseed and groundnuts, the weights being the area under these crops. The average works out at Rs. 11·8 per maund. The harvest price of rice in 1954-55 was Rs. 11·1 per maund. The conclusion is that of all the alternatives considered, Cropping Pattern I, growing kharif rice with light rabi crops, leads to the greatest increase in the value of agricultural production from the utilization of the irrigation water made available. The pattern recommended in the report is similar to this.

15. The limitations of the analysis and ways of allowing for them are indicated. No attention has been paid in the calculations to the problem of the maximum area that can be irrigated. A limit may be set by technical considerations. For instance, it may be technically possible, in the example that is being considered, to irrigate a maximum area of only 4 million acres. The calculations can be modified to allow for this technical constraint on net irrigated area. The net irrigated area under Pattern I and IV declines to 4 million acres, while the other two patterns are unaffected. The decline in the kharif irrigated area means an increase in the rabi cropped area to utilize all the available water. The aggregate figures of area and production are therefore modified for the patterns that are affected (Table IV). With the introduction of the maximum technical limit to irrigated area Pattern I still gives the largest increase in agricultural production, but it implies an impossibly high double cropped area. Pattern III may be in this case the most productive of the practicable patterns.[1]

16. Another limitation of the analysis is that it assumes that the available water can be used with perfect freedom at any time of the year. But since some of the irrigation projects will be merely diversion schemes, and because the storage capacity of the reservoirs is limited, it may be necessary to utilize water according to certain time pattern. This introduces another constraint on the alternative cropping patterns that can be selected. But this factor can also be allowed for in our calculations provided the time distribution of the total available pattern is known. For example, the storage capacity of the reservoirs may be limited so that it may be necessary to utilize at least 50 per cent of the total water made available in the kharif season. In Patterns I, III and IV (as modified in Table IV), over 70 per cent of the annual available water is used for the kharif crop, while in Pattern II the proportion is 50 per cent. Thus if the condition on the seasonal utilization of water is that at least 50 per cent be used up in the rainy season, no modification is necessary in Table IV.

17. A third limitation is related to the unsuitability of the gross productivity criterion for choosing between various alternatives, because it ignores costs. The capital costs involved in irrigation will vary with the net area irrigated and the pattern of cropping selected. A pattern involving large irrigated area means more channels and canals and higher capital cost than one involving a smaller irrigated area. It will also, probably, mean a larger loss of water due to seepage, evaporation and wastage. A pattern of cropping that uses a higher proportion of the available water in the kharif season may imply that less storage capacity is required in the projects

---

[1] No attempt is made here to choose the best way of utilizing the available water. Only the considerations relevant to such a choice are being indicated.

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
GSL

supplying the water, and this may mean lower capital cost. The first two of these considerations are in favour of Pattern II and the third in favour of the other three. They will modify the relative attractiveness of the various alternatives. Since no data are available it is not attempted to introduce cost considerations into our exercise but, in principle, it is possible to do so.

TABLE II

	Pattern I	*Pattern II*	*Pattern III*	*Pattern IV*
1. Net Area Irrigated (million acres)	4·705	2·706	3·984	4·705
2. Gross Area Irrigated (million acres)	6·587	3·788	5·578	5·002
3. Production on Irrigated Land (tons)				
Rice	1,960,000	1,550,000	1,832,000	2,084,000
Light Rabi	336,000	Nil	212,000	Nil

TABLE III

GROSS PRODUCTIVITY

	Pattern I	*Pattern II*	*Pattern III*	*Pattern IV*
1. Net Area Irrigated (million acres)	4·705	2·706	3·984	4·705
2. Production on this area without Irrigation: Kharif Rice: (thousand tons)	1069	617	908	1069
3. Production with Irrigation (thousand tons)				
Rice	1960	1550	1832	2084
Light Rabi	336	Nil	212	Nil
4. Increment of Output with Irrigation (3–2) (thousand tons)				
Rice	891	933	924	1015
Light Rabi	336	..	212	..
5. Value of Increased Output at 1954-55 Prices (Rs. lakhs)	3781	2826	3482	3075

CSL

TABLE IV

MODIFIED AGGREGATE AREA AND PRODUCTION

	Pattern I	*Pattern II*	*Pattern III*	*Pattern IV*
1. Net Irrigated Area (million acres)	4	2·706	3·984	4
2. Gross Irrigated Area (million acres)	7·7	3·788	5·578	4·56
3. Proportion Double Cropped (percentage)	92	40	40	14
4. Production on Irrigated Land (thousand tons)				
Rice	1670	1550	1832	191
Light Rabi	659	..	212	..
5. Production on Net Irrigated Area Assuming no Irrigation Kharif Rice (thousand tons)	912	617	908	912
6. Increase of Output with Irrigation (4–5) (thousand tons)				
Rice	760	923	924	
Light Rabi	659	..	212	1000
7. Value of Increased Output at 1954-55 Prices (Rs. lakhs)	44,24	28,26	34,82	30,30

Appendix 6

List of Suggested Small Scale Industries for Orissa (1961–71)

Description of Industry	*Number of Units*	*Capacity* (output per shift per unit)	*Number of men per shift* (per unit)	*Block capital* (Rs. lakhs per unit)	*Location and District*
(1)	(2)	(3)	(4)	(5)	(6)
A. FOREST BASED					
1. Timber Works (Sawing, Seaming, Chemical Treatment)	5	12 tons	40	3	(1) Bhanjnagar (Ganjam) (2) Kantabanji (Bolangir) (3) Balliguda (Phulbani) (4) Angul (Dhenkanal) (5) Rayagada (Koraput)
2. Manufacture of Doors and Windows (Sizing Log to Finishing Including Flush Doors)	2	8 tons	48	4	(1) Titiagarh (Bolangir) (2) Jharsuguda (Sambalpur)
3. Manufacture of Cable Drum, Automobile Body Building and Manufacture of Ambar Charkha and Reels	1	8 tons	48	4	Sambalpur
4. Plywood Manufacturing, Wood Wool Manufacturing and Slate Frames, and Pattern Making	2	10 tons	45	3·50	(1) Bada Barbil (Keonjhar) (2) Jajpur Rd. (Keonjhar)
5. Railway Wagon components and Sleepers	1	10 tons	48	4·50	Jharsuguda (Sambalpur)
6. Boat Building	1	5 tons	40	3·50	Chandbuli (Balasore)
7. Wood Distillation	2	15 tons	45	4·50	(1) Navjangpur (2) Dhenkanal
8. Sabai Grass Processing (Pulp, Rope, etc.)	1	10 tons	40	4	Nayagarh (Puri)
9. Tanning Extracts (Barks, Myrobalan Making Units, etc.)	1	50 lbs.	15	2	Bisaam–Cuttack (Koraput)
10. Wax Products (Collection, Curing and Tabulating of Sisal, Hemp and Bees Wax)	1	50 lbs.	25	2·50	Jharsuguda (Sambalpur)

१०
CSL

Description of Industry	*Number of Units*	*Capacity* (output per shipt per unit)	*Number of men per shift* (per unit)	*Block capital* (Rs. lakhs) (per unit)	*Location and District*
11. Acoustic and Insulation Boards, 100 Blocks and Blocks (for Air-conditionings etc.)	1	40	40	3·50	Barbil (Keonjhar)
B. MINERAL BASED					
1. Slate and Pencil Manufacturing Unit	1	20 gross slate 100 boxes	25	2	Titlagarh (Bolangir)
2. Graphite Asbestos Products	1	1 ton	45	3·5	,,
3. Bleaching Powder	1		48	4·5	Bisra (Sundargarh)
4. Ceramic Mouldings (Electrical Accessories)	1	5 tons	45	2·50	Rajgangpur (Mayurbhanj)
5. Sanitary Accessories	1	5 tons	45	3	Jaipur Rd. (Keonjhar)
6. Crockery Manufacture	1	3 tons	35	2·50	Rajgangpur (Mayurbhanj)
7. Stone-wares and Curies	1	5 tons	45	1·50	Karanjia and Baripada (Mayurbhanj)
C. CHEMICAL BASED					
1. Pharmaceutical Preparations (Syrups, Elixirs, Common Tablets and Extracts) (No Injectibles)	1	500 lbs.	40	3·5	Berhampore (Ganjam)
2. Pharmaceutical (Base Preparations from *Muxvonica, Serpentina Rowolfia*, Turmeric and others.	1	100 lbs.	30	2·5	Balasore
3. Colours and Chemicals (Especially Dry Colours, Distempers, Sindoor, Powder, etc.) (Side-line Inks and Glue)	1	3 tons	25	3	,,
4. Toilet Products (Face Powder, Talc Powder, Sindoors, Pastes, Jollys, Oils and Soap, Tooth-Paste and Allied Items)	1	1 ton in all	30	4	Cuttack or Jagatpur (Cuttack)
5. Distillation of Industrial Alcohol	2	200 gallons	45	4	(1) Aska (Ganjam) (2) Asthrang (Puri)
D. AGRICULTURE BASED					
1. Tomato Canning including Seed Treatment (Seasonal) can be combined with Fruit Pulping Unit (Manufacture of Sauce, Ketchup, Base Jelly and Crystal Jelly)	1	500 lbs.	30	2·5	Titlagarh (Bolangir)
2. Straw Pulp/Board Manufacture (Manufacture of Straw Pulp in Laps in the Form of Board)	2	5 tons of pulp or 2 tons lap, 2 tons board	45	4	Bhadrak (Balasore)

	Description of Industry	*Number of Units*	*Capacity* (output per shipt per unit)	*Number of men per shift* (per unit)	*Block capital* (Rs. lakhs) (per unit	*Location and District*
3.	Cashewnut Curing. (Fruit Ssorting to Packing including Treatment of Kernel, Shell and Oil Recovery)	2	2 tons of kernel, 1 ton of shell 5 gallons of Oil	40	3	(1) Basta (Balasore) (2) Chatrapur (Ganjam)
4.	Manufacture of Confectionery (from Gur and Khandsari)	1	2 tons	40	3	Aska (Ganjam)
5.	Bone Mill (for Manufacture of Crushed/Powdered Bone and Manure) (There will be a Glue Manufacture Unit with it)	2	10 tons	45	3	(1) Bhadrak (Balasore) (2) Navrangpur (Koraput)
6.	Leather Curing Unit (for Treatment of Raw-hide, Preservation and Tanning).	3	2 tons	35	2	(1) Berhampur (Ganjam) (2) Bhadrak (Balasore) (3) Navrangpur (Koraput)

CSL

Appendix 7

Phasing of the Establishment of Suggested Small Industries in Orissa (1961-71)

1. The main criteria used for phasing the small industry development programme are based on the following questions:

(*i*) Is there an immediate demand for the product ? When is there likely to be demand ?

(*ii*) Are the resources, both skills and raw materials, available at present in Orissa? Will they be available at a later date ?

(*iii*) Will the plant induce investment or give rise to feeder and ancillary and other industries ?

(*iv*) Is the plant a feeder, ancillary or service plant ? If so, when will its products or services be required ?

(*v*) Will the plant provide relief to a decaying industry, or relieve a depressed area?

2. Plants with immediate demand, readily available resources, plants necessary for the growth of other industries, plants with the widest impact on the State income and plants necessary to relieve depressed areas were given priorities. No statistical system of priority allocation was used. The number of criteria and their magnitudes helped to decide when the various plants should be constructed for maximum benefit to both the entrepreneur and the State.

3. It will be noticed that a larger number of small plants are suggested for the early years of the decade 1960-70. The consolidation and expansion of new plants may be undertaken in later years. The programme should be reviewed every two years.

PHASING OF SUGGESTED SMALL INDUSTRIES IN ORISSA
(1961-71)

Description of the Industry	*Phase I (1960-64)*	*Phase II (1964-70)*
1. FOREST BASE		
1. Timber works: saw mill units with carpentry and kiln seasoning	2	3
2. Manufacture of doors and windows	1	1
3. Manufacture of cable drum, automobile body building and other accessories	1	0
4. Railway wagon components, sleepers	1	0
5. Plywood manufacturing, slate frames pattern making, wood wool plant	1	2
6. Boat building	1	0
7. Wood distillation plants	1	1
8. Sabai grass processing—rope pulp, etc.	1	0
9. Tanning extracts	1	0
10. Wax products	0	1
11. Acoustic and insulation boards & blocks	0	1
TOTAL	10	9

CSL

PHASING OF SUGGESTED SMALL INDUSTRIES IN ORISSA (1961–71)—Contd.

Description of the Industry	*Phase I*	*Phase II*	
2. MARINE BASE			
1. Deep sea fishing	1	0	
2. Fish canning and fish product processing	0	1	
TOTAL	1	1	(2)
3. MINERAL BASE			
1. Slate pencil manufacturing unit	0	1	
2. Graphite and asbestos products	0	1	
3. Manufacture of bleaching powder	1	0	
4. Ceramic mouldings—electrical accessories	1	0	
5. Sanitary accessories	0	1	
6. Crockery manufacturing	0	1	
7. Stonewares and curios	1	1	
TOTAL	3	5	(8)
4. AGRICULTURAL AND ANIMAL BASE INDUSTRIES			
1. Tomato canning including seed treatment	1	0	
2. Straw pulp/board manufacture	1	1	
3. Cashew-nut curing (from sorty to packing)	1	1	
4. Manufacture of confectionery	1	0	
5. Bone mills—manufacture of crushed bone manure	1	1	
6. Leather curing unit (preserving, tanning)	2	1	
TOTAL	7	4	(11)
5. CHEMICAL BASE			
1. Pharmaceutical preparations (syrups, elixir)	1	0	
2. Pharmaceutical unit—extracting essences, tinclines, etc.	1	0	
3. Manufacturing chemicals, colours, distempers	1	0	
4. Manufacture of toilet products	0	1	
5. Distillation of industrial alcohol	1	1	
TOTAL	4	2	(6)

PHASING OF SUGGESTED SMALL INDUSTRIES IN ORISSA (1961–71)—Contd.

Description of Industry	*Phase I*	*Phase II*	
6. METAL BASE			
1. Ferrous foundry-cum-M/C shop manufacture of cane crushers, pumps crushers	0	1	
2. Manufacture of building construction hardware	0	1	
3. Sheet metal fabrication—Drums, buckets	1	0	
4. Wire nails, screws, bolts and nuts	0	1	
5. Household articles, agricultural implements	1	0	
6. Furniture for offices and hospitals	0	2	
7. Structural steel shop—contract jobs for buildings, ship repair, bridge work, etc.	0	1	
8. Engineering tools—scales, calipers, etc.	0	1	
9. General engineering and jobbing—mechanical feeder industry to all English firms	1	2	
10. General engineering electrical works	1	1	
11. Malleable steel foundry—manufacture of cement pipes and accessories	0	1	
12. Cycle parts manufacture	1	0	
13. Non-ferrous die castings—bell metal brass	2	1	
14. Brass rolling Mills	2	1	
15. Bell metal and non-ferrous sheet metal factory	1	0	
16.[a] (*a*) Household interests of cutlery (*b*) Hospital appliances (*c*) Curios and specialities (*d*) Electrical fittings, etc., screws and bolts (*e*) Job work plant (machine part of specialities) (*f*) Stationery requisites including pins, clips (*g*) Locks and building materials (*h*) Pelromese lamps, bed room lamps (*i*) Cycle parts, commercial wares (*j*) Water and gas pipe fittings	10 Plants		
TOTAL			(40)
7. GENERAL			
1. Flour milling (including separating sooji and maida)	1	1	
2. Bakery-cum-biscuit plant	0	1	
3. Hosiery mill—manufacturing of banians, socks	0	1	
4. Readymade garments, building	2	3	
5. Photo-litho printing and offset (ind. die stamping and calendar manufacture)	1	1	
6. Spectacles frame manufacture and glass grinding	0	2	
7. Sports goods	2	1	
8. Printing accessories	0	1	
TOTAL	6	11	(17)

---

[a] These plants may be constructed as soon as the sheet metal factory goes into operation.

GSL

Appendix 8

Principal Rail Projects and Open Line Works in Orissa during Second Five Year Plan

Projects	*Progress as on 31.3.1959*
NEW CONSTRUCTION	
(*i*) Naomundi–Banaspani Branch (17·9 miles, Rs. 229·54 lakhs)	91·5 per cent completed and opened to goods traffic in April, 1958.
(*ii*) Bondamunda-Dumaro line (42 miles, Rs. 799·69 lakhs)	59·0 per cent completed: 15 miles of track linked. In Progress.
(*iii*) Extension of Barabil branch to Panposh–Gorge (5·8 miles, Rs. 113·13 lakhs)	78 per cent completed: expected to be completed before the monsoon.
(*iv*) Bondamunda–Nawagaon–Purnapani line (17 miles)	Survey completed: work in field to start after monsoons in 1959.
(*v*) Construction of Sambalpur–Titlagarh	Survey completed: work in field to start after monsoons in 1959.
DOUBLING	
(*i*) Manoharpur—Rourkela Section (25·2 miles, Rs. 187·54 lakhs)	Throwforward from First Plan, 99 per cent completed, signalling work in progress.
(*ii*) Rajkharswan—Barajamda Section (60·6 miles, Rs. 2,106·75 lakhs)	Throwforward from First Plan, 88 per cent completed; opened in stages during May-December 1958.
(*iii*) Rourkela—Durg Section (285·8 miles, Rs. 2,106·75 lakhs)	Signalling works in progress. 78 per cent completed; 250 miles in Section opened slow line.
LIME CAPACITY WORKS	
(*i*) Strengthening work, Rourkela–Birmitrapur Branch	Work completed; new Keolbridge opened to traffic, December 1958.
(*ii*) Increasing line capacity throughout East Coast Section; provision of 13 crossing stations and additional reception lines at 22 stations	8 crossing stations and 10 reception lines completed.

(*iii*) Increasing line capacity at Nerguadi–Khurda Road section by provision of a block hut between Retang and Khurda Road with remodelling of Bhubaneshwar and Cuttack yards and minor yard facilities at Khurda Road, and improved signalling arrangements (Rs. 8·51 lakhs)	In progress.
(*iv*) New marshalling yard at Bonda-munda near Rourkela (Rs. 392 lakhs)	Exchange yard for the steel plant nearly completed, rest in progress.
(*v*) Raipur–Vizianagaram Section 3 crossing stations (Rs. 11·95 lakhs) 7 additional reception lines (Rs. 24·77 lakhs)	Three crossing stations and 6 additional reception lines completed.
SIGNALLING IMPROVEMENTS	
Replacement of 50 token instruments by tokenless block working at Cuttack–Hakshannath Road Section, East Coast (Rs. 928 lakhs)	
BRIDGE REHABILITATION WORKS	
Jharsuguda–Sambalpur regirdering of 11 bridges	Kharagpur, Nagpur and Kharagpur–Waltair Sections completed.
LOCO SHEDS	
Loco Shed at Dangaoposi (Part of Rajkharswan–Barajamda doubling)	
ELECTRIFICATION	
Electrification, Tatanagar–Rourkela Section	

SOURCE: South Eastern Railway, Second Plan Progress up to 31.3.1959.

GSL

Appendix 9

Note on the Method of Estimating Requirement and Supply of Technical Personnel for the Period 1961-71

On the basis of industry-wise breakdown of the working force by categories of occupations given in the *Occupational Pattern in Manufacturing Industries, 1956* published by the Planning Commission, managerial and supervisory staff for industries recommended in this report for the decade 1961–71 has been estimated at 12,878, of which 10,977 are in metal-based, metallurgical and chemical (including forest-based) industries and 1,881 in agriculture-based industries.

2. On the same basis 38 per cent of the managerial and supervisory staff in the metallurgical, metal-based and chemical industries and 21 per cent in the agricultural-based industries are taken to consist of engineers and overseers. The same ratios are used for mining also and the requirement for engineers and overseers comes to 2,035 and the total for mining and manufacturing industries to 6,609.

3. For the requirement in the development programmes of the Government (including replacements) it is assumed, on the basis of the study made for Madras in the Techno-Economic Survey, that it will be roughly 50 per cent of the requirement in industry. This will give a figure of 2,287

4. For replacement requirements in industry, the employment in 1961 is taken at 80,000 of which the annual replacement will be 3 per cent or 2,400. Annual replacement, assuming the same ratio of engineers to total employment as in the suggested new industries, comes to 118. Employment in mining in 1961 is estimated to be 82,000. Assuming the same ratio of engineers to total employment in the suggested new mining units taking 3 per cent of 1961 mining employment to represent replacement needs, the replacement demand in mining comes to 32. Thus the total annual requirement of engineers and overseers including replacement comes to 1,040.

Supply

5. The annual capacity of the existing engineering college is expected to be 180 by 1961. In addition, the capacity of diploma colleges is expected to be 540 annually. Allowing for a 15 per cent wastage, the annual supply of both engineers and diploma holders comes to 612.

Craftsmen

6. The new industries suggested by the NCAER will require 29,309 skilled workers for the period 1961–71. This is also on the basis of industry-wise breakdown of the working force by categories of occupation given in the *Occupational Pattern in Manufacturing Industries, 1956* published by the Planning Commission.

7. Using the same ratios, the requirement in mining is estimated at 61,305.

8. The public sector requirement including replacement, again on the basis of a study in the Techno-Economic Survey of Madras State, is estimated to be 6·5 per cent of the requirements of new industries suggested. This gives a figure of 1,905. Thus the total additional requirement for craftsmen works out at 92,249 for the period 1961–71.

Replacements

9. Assuming the same ratio of skilled workers to total industrial employment in the new industries suggested—32·2 per cent—and on the basis of a 3 per cent replacement need, the replacement demand for skilled workers in industry comes to 778 per year. Similarly, in mining the replacement works out to 959, making the total annual requirement of skilled workers 10,962.

Supply

10. By 1961, the industrial schools will train 1,129 candidates. Allowing for a 15 per cent wastage, the annual availability will be roughly 960. 200 persons are expected to receive training annually in coal mining and 100 persons through the tribal welfare department. This makes the total availability 1,260.

11. Assuming that in-plant training facilities provide training for an equal number of persons as those trained in the institutes, the total annual supply of skilled workers can be estimated to be about 2,260.

GSL

Appendix 10

Estimates of Outlays for Major Health Schemes During 1961-71

Malaria Eradication

The estimate of the cost of this programme for the Third Plan has been made by applying the per capita expenditure on population covered during the First and Second Plans, to the population to be covered in the Third Plan. Estimated expenditure was Rs. 40 lakhs and population covered 6 million. Balance of population to be covered was about 11 million. The expenditure in the Third Plan was therefore estimated at $\frac{4}{6} \times 110 = \frac{220}{3} =$ Rs. 73 lakhs.

2. However, in view of the fact that the State Government now claim to have covered the entire population under this programme, a provision of Rs. 50 lakhs or Rs. 5 lakhs a year is made for intensification of the programme and for fixed investment in equipment and trucks, etc.

Supply of Quinine

3. Estimate of the cost of supplying tablets is very rough. It is based on the premise that annually about 2 to 2·5 million people would need quinine for prophylactic or curative purposes, at the rate of 10 tablets per person a year; at a price of 3 nP per tablet, the total cost would be Rs. 6 to 7·5 lakhs, and that about half of them would need free supply. The cost to the Government may therefore be Rs. 3 to 4 lakhs per year. Total cost over ten-year period, 1961–71, would be about Rs. 40 lakhs.

Anti-Filaria Programme

4. The allocation in Third Plan is taken at 50 per cent more than that in the Second Plan. This gives a figure of Rs. 30 lakhs for the Third Plan. The same figure is adopted for the Fourth Plan.

Urban Water Supply

5. Rs. 1·75 crores were provided for these works in the Second Plan to cover an urban population of 600,000. This gives a per capita figure of Rs. 29. A round figure of Rs. 30 is adopted for the future works to be done during 1961–71.

Urban Drainage and Sewage

6. In the Second Plan the cost of the scheme for Cuttack, a city of 100,000 population was estimated to be Rs. 1·20 crores. On this basis the per capita cost comes to Rs. 120. For the

future, per capita cost is assumed to be 20 per cent more, i.e., Rs. 144, and urban population for which provision is to be made by 1971 is estimated at one million.

Rural Water Supply

7. Provision under the Second Plan (Rs. 47·5 lakhs) is expected to increase by 50 per cent for the Third Plan, and the Third Plan provision to increase again by 50 per cent, for the Fourth Plan. On this basis Third Plan provisions would be Rs. 70 lakhs and Fourth Plan estimate, Rs. 105 lakhs.

Mobile Health Units

8. According to the First Plan provision the average cost per unit comes to Rs. 20,000. This presumably is the current expenditure per unit for five years. Hence another sum of Rs. 20,000 per unit has been added to include the cost of a vehicle for each new unit. 26 units in the Third and Fourth Plans would thus require Rs. 5·20 lakhs for vehicles and Rs. 5,000 a year per unit for current expenditure. The current expenditure for the first 13 units over 10 years would be Rs. 6·50 lakhs and for the next 13 units over 5 years of Fourth Plan, Rs. 3·25 lakhs. The total cost over 10 years under this programme would be about Rs. 15 lakhs.

T. B. Control

9. The Second Plan allocation of Rs. 40 lakhs is expected to be increased by 50 per cent for the Third Plan, and the Third Plan figure again by 50 per cent for the Fourth Plan. This gives estimates of Rs. 60 lakhs and 90 lakhs for Third and Fourth Plans.

Leprosy Control

10. Same basis as above is applied to the allocation of Rs. 48·4 lakhs provided in the Second Plan. Thus for the Third Plan the estimate is about Rs. 70 lakhs and for the Fourth Plan Rs. 105 lakhs.

Distribution of Vitamin Tablets, etc.

11. School-going population in 1956-57 was 800,000. This may easily exceed the million mark during 1961–71. If only 2 vitamin tablets are to be supplied to each student for at least 200 days in a year, and each tablet costs, say, 2 nP, then the cost per year per student would be Rs. 8 and the total would be Rs. 80 lakhs a year. This cost is not included in the State Plans for reasons, stated in the report. However, an expenditure of Rs. 5 lakhs is suggested in the Third Plan for experimental purposes and about Rs. 10 lakhs in the Fourth Plan for a more intensive effort in this field.

Hospitals and Dispensaries

12. According to the Second Plan norms, there should be one hospital bed per 1,000 of population. On this basis Orissa would need some 21,000 beds by 1971 when its population reaches a level of 21 million. By 1961, the number of beds in Orissa, in hospitals, dispensaries

and primary health units would be about 4,000 and the shortfall by 1971, would therefore be of the order of 17,000. Again if 1,000 primary health units suggested in the report are established by 1971, they should provide 10,000 additional beds. The shortage to be met by hospitals and dispensaries may therefore be about 7,000 beds. In view of the need to conserve resources in Orissa for other high priority health schemes, the objective during 1961-71 may be kept at 3,500 additional beds in hospitals and dispensaries. Even this order of development would require an allocation of Rs. 5 crores, at the rate of Rs. 14,300 per bed,[1] as the cost of new hospitals and dispensaries.

Maternity and Child Welfare, Family Planning, etc.

13. In the Second Plan allocation for these programmes was about Rs. 15 lakhs. This amount may be doubled for the Third Plan and for the Fourth Plan, the Third Plan figures increased by 50 per cent. This would mean a provision of Rs. 30 lakhs for the Third Plan and Rs. 45 lakhs for the Fourth Plan, thus adding up to a total figure of Rs. 75 lakhs for the period 1961–71.

---

[1] Based upon Second All-India Plan data.

Appendix II

Methods and Basis of projections of the State Government's Receipts and Expenditure (on Revenue Account) in 1961-71

Tax Revenues

Receipts from individual taxes have been projected at rates indicated below. The base for the projections is the revised estimate for 1960-61. No credit is taken for the yield from additional taxation except in the case of land revenue. In this case, the yield is taken gradually to increase by 50 per cent by the end of 1965-66 as result of revision of settlements. The yield of agricultural income tax is assumed to be negligible after 1966 on the basis that land reforms may be completed by that date. As the road and water transport tax is levied at present only in respect of a few commodities, it is difficult to relate it to any other known rate of increase; hence no increase in yield is taken into account. The amount involved is not significant.

Non-Tax Revenues

2. *Revenues from forests*: Intensive development of existing forest resources as well as more business-like disposal of minor forest produce is expected to increase forest revenue by Rs. 17 lakhs by 1970-71. Further, the fruits of afforestation are expected to be received by the State beginning from 1964-65. Additional revenue on this account in 1970-71 is expected to be Rs. 48 lakhs.

Profit from Electricity Undertakings

3. Consumption of electricity in Orissa is expected to increase from 697 million kWh in 1960-61 to 3719 million kWh in 1970-71. The shares of public sector generation in total consumption are estimated to be 547 million kWh, 1,758 million kWh and 3,419 million kWh respectively. Total profits from electricity are calculated on the assumption that the average rate of net profit would be one nP per unit.

4. *Profits from mining*: The mining of iron ore is expected to increase from 4 million tons in 1960-61 to 26 million tons in 1970-71. If we assume that half of this increase will be in the public sector as a result of the development of the Orissa Mining Corporation, output in the public sector will be 11 million tons in 1970-71. At the rate of profit of Rs. 2 per ton, the profits of the Corporation will increase from Rs. 0·2 crore in 1961-62 to Rs. 2·2 crores in 1970-71. Half of the profits of the Corporation is assumed to be accruing to the State Government year by year.

5. Royalties from mining are expected to rise from Rs. 59 lakhs in 1960-61 to Rs. 3 crores in 1970-71. (*See* Chapter 6).

6. Administrative receipts have been projected at the rate of 5 per cent per annum (average).

GSL

PROJECTIONS OF TAX REVENUE IN ORISSA (1961–71)

(Rs. crores)

Name of Tax	*Yield in 1960–61*	*Basis of Projections*	*Total Yield 1961-71*
1. Share of Income Tax	3·24	Estimated Rise in Income in Secondary and Tertiary Sectors in All-India[a]	46·63
2. Estate Duty	0·08	Trend in Receipts[b]	1·35
3. Tax on Railway Fares	0·24	Growth in Passenger Traffic[c]	2·78
4. Share of Union Excise	2·67	Increase in the Output of Excisable Commodities Concerned[d]	35·32
5. General Sales Tax	2·53	Estimated Rise in State Income[e]	44·96
6. Stamps and Registration	0·79	do.	13·87
7. Entertainment Tax	0·14	do.	2·42
8. Motor Vehicles Tax	0·79	Rate of Growth of Traffic[f]	12·22
9. Sales Tax on Motor Spirit	0·37	do.	5·70
10. Land Revenue	3·14	50 per cent Increase by 1965-66	43·94
11. Road Transport Tax	0·44	No Increase	4·40
12. Agricultural Income Tax	0·03	No Yield After 1965-66	0·15
13. State Excise	1·25	Estimated Rate of Growth of Population[g]	13·85
14. Electricity Duty (Fees)	0·04	No Increase	0·40
TOTAL	*15·75*		*227·99*

[a] 8 per cent per annum. Income in the secondary and tertiary sectors is expected to rise by 7 per cent per annum in the country as a whole. Since the Corporate Sector will grow at a faster rate, an 8 per cent rate of growth is chosen for income tax yield.

[b] On the basis of past trend, the share of estate duty is assumed to increase by Rs. 1 lakh per annum.

[c] Based on Planning Commission's Projections.

[d] 55 per cent per year in 1961–66 and 5·5 per cent per annum (over the 1965–66 base) in 1966-71; derive from projection of output of the excisable commodities concerned during the Third Plan Period.

[e] 14 per cent per annum; National Council's Projections.

[f] The yield of motor vehicles' tax and that of sales tax on motor spirit are taken to increase at 10 per cent per annum, that is, at a rate slightly lower than the rate of growth of State income. Implicitly traffic and number of vehicles are assumed to increase at the same rate.

[g] 2 per cent per annum being the estimated rate of growth of the population of the State, it is assumed that the per capita consumption of liquor will remain constant.

NOTE: 1. All rates are average rates except in the case of railway fares.
2. In the case of all shared taxes the percentage shares going to Orissa are taken, being as constant.
3. Electricity duty in Orissa is only in the nature of licence fees.

Development Expenditure

7. 1960-61 revised estimate has been taken as the basis. From this has been deducted Plan expenditure on Revenue Account in 1960-61. The remainder of the expenditure is projected at 2 per cent per annum. To this has been added the committed expenditure on Second Plan schemes.

Non-Development Expenditure

8. With 1960-61 revised estimate as the basis, non-development expenditure has been projected at the rate of 3 per cent per annum. Interest charges are assumed to average Rs. 3 crores per annum during the ten-year period. No allowance is made for repayment of debt to the Centre. Market loans outstanding are not very large and conversion operations can be easily undertaken in respect of those loans.

Market Loans and Share of Small Savings

9. Targets for the Third Plan have been taken as the basis. The target for 1966-71 has been arrived at by increasing the base by 50 per cent. As already indicated, it has been assumed that having made some arrangement with the Centre about the loans contracted on account of Hirakud, the State will be in a position to borrow further from the market for productive investment.

GSL

Appendix 12

Proposed Investment by Centre, State and Private Sector in Orissa During 1961-71

Agriculture and Allied Activities

Public investment in agriculture is estimated in Chapter on Agriculture (Chapter 2) and is presented in Table 15. The entire investment of Rs. 212·3 crores would be in the State sector. The private investment in agriculture is estimated as follows:

> The ratio of private investment to public investment in agriculture in the (all-India) Draft Third Plan is 40 per cent. Since agricultural incomes in Orissa are rather low, it is assumed that the ratio for the State would be about 30 per cent. Private investment in agriculture during 1961–71, therefore, is Rs. 63·7 crores, that is 30 per cent of Rs. 212·3 crores.

2. Total investment proposed for development of livestock, forestry and fisheries, for the period 1961–71 is Rs. 33 crores, which would all be in the State sector.

Large Scale Factory Industry

3. A total investment of Rs. 538·6 crores is proposed for large scale industries during 1961–71 both in the public and private sectors as presented in Tables 36 and 37 indicating the phasing between the Third and Fourth Plan periods.

Small Scale Factory Industry

4. The public investment in small scale factories is estimated at Rs. 9 crores—Rs. 6 crores in industrial estates and Rs. 3 crores in the Pilot Project. In the Third Plan the ratio of private to public investment in small scale industry is estimated at 1·8 : 1. Orissa being relatively under-developed and lacking in an active entrepreneurial class, a lower ratio of 1·5 : 1 may be expected. Private investment in small scale industry during 1961–71 is thus estimated at Rs. 13·5 crores.

5. The total investment in factory industry is Rs. 561·1 crores. Of this, Rs. 450 crores relating to steel industry would be by the Centre, Rs. 9 crores in small scale and the rest in private sector (i.e., Rs. 113·5 crores).

Cottage Industries

6. In the Third Plan a ratio of 2 : 1 between public investment in small scale and in cottage industries is indicated. This ratio is applied to the public investment in small scale industries in Orissa (i.e., Rs. 9 crores) to estimate public investment in cottage industries during 1962–72 at Rs. 4·5 crores. On the basis of the Third Plan ratio of 1 : 1·6 between public and private

investments in cottage sector, private investment in cottage industries in Orissa over the decade is likely to be Rs. 7·2 crores.

Mining

7. Total investment in mining comes to Rs. 57·1 crores. Of this, all the investment in coal mining (i.e., Rs. 15 crores) is attributed to the Central Government. It is indicated in the chapter on Mining that about half of the additional production of iron ore, and therefore about half of the investment in iron ore mines during 1961–71 (i.e., Rs. 20 crores) would be by the Orissa Mining Corporation. Half of this investment is attributed to the Central Government and the other half to the State Government, as both share the capital of the Corporation on that basis. The remainder of the investment in mining (i.e., Rs. 22·1 crores) is in the private sector.

Power

8. The whole of the investment (Rs. 184 crores) in power development is by the State Government.

TERTIARY SECTOR

(*a*) *Transport*

9. Investment of Rs. 30·4 crores on railways is by the Central Government, and of Rs. 30·4 crores in roads, forest roads, inland waterways, nationalized road transport, etc., by the State Government (Table 60). Investment in private transport during the present decade would be largely related to development of industries and roads in Orissa; and on a broad estimate some 10,000 additional trucks may have to be added to the existing fleet. On a conservative basis, private investment in new goods carriers may, therefore, be placed at Rs. 30 crores. In addition, an investment of about Rs. 10 crores would be required in the Central Government sector, for construction of Paradip port. According to the Third Plan about 6 per cent of the expenditure on transport is allocated to the development of communications. Applying this proportion to the transport investment proposed for Orissa, approximately Rs. 5·8 crores investment in communications is expected. All of this will be in the Central Government sector.

(*b*) *Public Health*

10. In the chapter on Public Health an investment of about Rs. 27·2 crores is proposed. This will be in the State Government sector.

(*c*) *Housing*

11. The investment in rural housing is estimated as follows:

In the Reserve Bank estimate of rural investment a ratio of 1·4 : 1·0 is indicated between private investment in agriculture and investment in rural housing for all-India. Applying this ratio to the estimated private investment in agriculture in Orissa (i.e., Rs. 62·4 crores) rural housing investment is estimated at Rs. 44·6 crores.

12. Private investment in urban construction is estimated as follows:

The cost of urbanization according to Town Planning estimates by Eheveria works out at roughly Rs. 1,600 per capita. This includes private housing, sanitation, health and other facilities. This represents an ideal situation. In actual fact the cost of urbanization may be taken at Rs. 800 per capita for Orissa. The urban population is estimated to increase by about 1·5 million during 1961–71. The total cost of urbanization is, therefore, likely to be about Rs. 120 crores. Of this, about Rs. 27·2 crores would be part of public health investment (*See* Table 79) and should be deducted. Practically all the investment in education represents construction costs, and so the estimated investment in education should also be deducted from the cost of urbanization to get an estimate of urban private and commercial construction. As indicated below, this comes to Rs. 32·6 crores. After the deduction indicated, the private investment in urban residential and commercial construction in Orissa during 1961–71 is likely to be Rs. 60·2 crores.

(*d*) *Education*

13. The estimated investment in education is computed as follows: About a fourth of the population consists of children aged 5-14 years. About 40 per cent of these would be in school at the end of the Second Plan. If universal primary education is to be achieved, with the given cost of Rs. 86 per primary school student, the total investment in primary education is estimated at Rs. 28·8 crores. Of this 90 per cent may be taken to be rural. Secondary and university education is estimated to require another Rs. 14·7 crores. An investment of Rs. 15 crores is estimated to be necessary to increase the existing facilities for training engineers by 120 per cent and for craftsmen by 450 per cent as proposed in the report. The total estimate for education adds up to Rs. 50·5 crores, all of it by the State Government.

(*e*) *Miscellaneous*

14. In addition, an investment of Rs. 14·8 crores is considered necessary for miscellaneous items of investment chiefly by the State Government, e.g., on welfare of backward classes and demonstration centres and resettlement programmes in tribal areas.

15. The total investment in the tertiary sector during 1961–71 would thus aggregate to Rs. 304·1 crores as indicated in the table below:

BREAKDOWN OF TERTIARY INVESTMENT IN ORISSA (1961-71)
(Rs. crores)

	Centre	*State*	*Private*	*Total*
Transport	46·2	30·6	30·0	106·8
Public Health	..	27·2	..	27·2
Housing (Rural and Urban)	..	..	104·8	104·8
Education	..	50·5	..	50·5
Miscellaneous	..	14·8	..	14·8
TOTAL	*46·2*	*123·1*	*134·8*	*304·1*

GSL

Appendix 13

State Income of Orissa, 1970-71—Methodological Notes

The estimates presented represents the net social product and net income. They indicate the income generated in the State and not the income accruing in the State. For estimating the latter, it would be necessary to adjust for the quantity of plus/minus remittances.

2. The estimates are tentative and are made to assess broadly the relative change in the magnitudes of sectoral incomes and per capita income.

Agriculture

3. Net addition to the agricultural output during 1961–71 is estimated by deducting 14 per cent from the increase in gross output expected to occur during 1961–71. The additional increase has been estimated by the product method. The figure thus obtained is Rs. 107·02 crores.

Animal Husbandry

4. Net output has been estimated by applying a capital output ratio of 2 : 1. The additional investment for the period 1961–71 is estimated at Rs. 8 crores. This gives an additional net output of Rs. 4 crores.

Forestry

5. The net output of forest is estimated by utilizing a ratio of 1 : 10 for revenue and net output. The revenue increase for the period 1961-71 is estimated on the basis of increased output from existing forests and new plantations.

Fishery

6. The net output of fisheries has been estimated by the product method. Output of fisheries is expected to increase by 75,500 tons. An average price of Rs. 50 per maund has been used to arrive at the value of gross output which is netted at 5 per cent to give a figure of Rs. 9·57 crores.

Mining

7. The net output is estimated by the product method. After netting at 7 per cent for all minerals and 13 per cent for coal, additional net output of Rs. 33·24 crores is obtained.

Factory Industries

8. The additional net output for 1961–71 is estimated by the product method. The additional net output from large scale factory industry comes to Rs. 146 crores and from small scale factory industry to Rs. 11·25 crores.

CSL

Power

9. Additional net output for 1961–71 is obtained by applying a capital-output ratio of 10 : 1 to the additional investment estimated to be required for power development during the period. The proposed investment is Rs. 184 crores and after applying the ratio, the additional output comes to Rs. 18·4 crores.

Non-Factory Industries

10. Income spent on products of non-factory industries in 1961 was 6 per cent. (Obtained by dividing the net output for non-factory industry by the net output of the State and multiplying by 100.) On the assumption that 3 per cent (half the proportion in 1961) of the additional income generated between 1961–71 would be spent on products of non-factory industry, the additional net output of non-factory industry for the period 1961–71 comes to Rs. 14·72 crores.

Construction

11. On the assumption that the Fourth Plan investment is 50 per cent higher than the Third, and that the investment is distributed evenly within each Plan period the total investment in 1971 is estimated at Rs. 178·2 crores. For estimating the income from construction activities expenditure on construction is taken at 44 per cent of the total investment (*refer* Table 10). The construction expenditure in 1971 is thus estimated at Rs. 74·8 crores. At the rate of one-third of construction expenditure the total net output due to construction in 1971 is about Rs. 24·9 crores.

Tertiary Sector

12. The rate of growth of commodity output which comes to 140·5 per cent for the 10-year period is applied to obtain the net output of the tertiary sector for 1971. On this basis, the additional net output of tertiary sector for 1961–71 comes to Rs. 159·78 crores.

Index

A

- Absenteeism, 70
- Account
  - Capital, 150, 153, 154
  - Revenue, 150, 154
- Afforestation, 38, 42
- Agency
  - estimating, 112
- Agriculture, 4, 9, 10, 11, 28, 176
  - production, 15
- Agricultural Personnel Committee, 25
- Allocation
  - Plan, 142
  - size and pattern of, 149
- Anchal Shat ban, 17
- Andhra Pradesh, 10, 11, 20, 23, 24, 31, 32, 50, 53, 55, 56, 59, 60, 64, 83, 102, 109, 110, 114, 151, 176
- Animals
  - Draught, 29
  - Working, 29
- Animal husbandry, 28, 170, 177
- Area, 1, 2, 11, 15, 34
  - Cropped, 10
- Asansol, 48
- Assam, 151, 152
- Average
  - Price, 4
  - Yield, 4, 10

B

- Bamboo regrowth, 41
- Belgium, 62
- Betterment levy, 189
- Bidis, 37
- Bihar, 11, 23, 24, 31, 52, 53, 56, 59, 60, 61, 62, 63, 102, 113, 151
- Block
  - Community Development, 33
  - Poultry Scheme, 32
- Bokaro, 66
- Bombay, 50, 53, 55, 56, 59, 63, 92, 150
- Boundary, 1
- Breed, 28
- Bridges, 122, 125, 185
- Budgetary Position
  - present, 150

C

- Calcium, 30
- Calcutta, 32, 44, 47, 48, 92, 122
- Canals, 16, 17
  - Kandrapara, 125
  - Taldanda, 125
- Capital, 71
- Cattle
  - Feed, 28, 29
  - milch, 29
  - Red Sindhi, 28
  - Upgrading of, 30
- Cattle Composition, 29
- Causes, 10
  - Proximate, 136
  - Remote, 141
- Census, 3, 131
- Central tableland, 15, 16, 17
- Central tract, 16
- Central Water & Power Commission, 17, 110
- Central Upland, 15
  - Artificial insemination, 30, 33
- Cess, 71
- Chilka lake, 46, 49
- China, 59, 91
- Climate, 11, 23, 176
- Coastal
  - Fishing, 43
  - lines, 1, 7, 9
  - Plain, 2, 12, 15, 16, 17, 121
  - Region, 15
- Compost, 20
- Communication, 27
- Consumption
  - Per Capita, 23, 108
- Control
  - Filaria, 146, 188
  - Leprosy, 148
  - Malaria, 146, 188
  - Tuberculosis, 148
- Cooperatives, 49
- Creameries, 33
- Crops
  - Bajra, 30
  - Cashewnut, 21
  - Cotton, 23
  - Groundnut, 22
  - Jowar, 30
  - Jute, 21, 22, 23, 25
  - Linseed, 22
  - Millets, 25
  - Pulses, 22, 23, 25, 26
  - Rape and mustard, 22
  - Rice, 21, 25, 30
  - Straw (Paddy), 29, 30
  - Sugarcane, 23, 25
  - Tobacco, 21, 22, 23

Cultivation
  Backward techniques of, 4
  Extension of, 15
  Japanese method of, 21
  Shifting, 2, 21, 35, 40, 178

D

Deficiencies
  Dietary, 149
Delta, 15
Delta irrigation scheme, 22
Demand in the non-agricultural sector, 131
Development, 9
  Agricultural, 121
  Broad Strategy for Industrial, 79
  Conditions for, 69, 171
  Dairy, 31
  Economic, 121
  Forest, 170
  Future, 15, 37, 125
  Industrial, 121
  of Fisheries, 122
  of Transport facilities, 185
  Power, 169, 184
  Programme, 77
  Railway, 126
  Road Plan in India, 125
  Transport, 170
  Twenty Years Road Plan, 125
  Diseases, 3, 136
Dispensaries, 148
Diversification, 16
Diversion work and tank, 18
Drainage, 142
Duduma Transmission Line, 110

E

Eastern Ghats, 1, 12, 15, 16, 21, 178
Economy
  Impact on the, 68, 172
  Structure of the, 4
Eggs, 32
Employment, 10, 33, 52, 53, 67, 68, 73, 78, 81, 82, 100, 149
Entrepreneurship, 71
Estuarine Fishing, 46
Expenditure
  Development, 153, 188
  Trends in, 152
Extraction, 35
  Rate of, 39

F

Fever, 136
Fertilizers, 12, 18, 19, 20, 27, 132
Finance, 101, 188
Finance for future development, 155
Financial resources, 150
Financing of the Plans, 154
  First Plan, 155
  Second Plan, 155
Fish, 7
  Consumption, 43
  Fresh water, 43
  Grangonids, 44
  Perches, 44
  Pomfret, 44
  Prawn, 44
  Sciandis, 44
  Sea, 43
Fisheries, 43, 178
  Culture, 47
  Marine, 43, 44
  Riverine, 47
Fishermen
  Training of, 50
Forest, 2, 7, 9, 15, 21, 34, 178, 182
  Demarcated protected, 34
  Reserved, 34
  Roads, 126
  Types of, 34
Forest Produce
  Asan, 35
  Bamboos, 7, 36, 41, 77
  Bija, 35
  Broom Grass, 37
  Cashew, 38
  Casuarina, 38
  Charcoal, 35, 36
  Kendu, 37
  Minor, 37
  Sabai grass, 37
  Sal, 35, 38
  Teak, 35
  Timber, 35, 36
Foodgrain, 16, 17, 18, 19, 20, 25, 26, 142
France, 62

G

Geological Survey of India, 68
Germany, 59
Grazing, 23
Green manuring, 20
Ground water, 18
Growth
  Agricultural, 125
  Future, 98, 102
  in Primary Sector, 170
  in Tertiary sector, 171
  Industrial, 125, 167

GSL

of agricultural production, 25
of forest output, 42
of Mining Industry, 65
Main directions of, 167
Pattern of, 165, 190
Sectoral, 173
Trade & Commerce, 26
Trend of, 8, 9

H

Hariana, 28, 30
Health, 3, 9
  Medical, 142
  Public, 136, 138, 187
Hirakud, 8, 106, 107, 110
Hirakud Power Utilization Scheme, 109
Hirakud Project area, 22
Hospitals, 148
Humus, 12

I

Implications
  Economic and Social, 138
Improved practices, 20
Income, 73
  Per capita, 151, 165, 167, 175
Industry, 4, 7, 8, 9, 11
  Agriculture-based, 82, 101, 181, 182
  Aluminium, 89
  Bidi, 22, 74, 100
  Caustic Soda, 94
  Chemical, 181
  Chemical based on non-mineral resources, 93, 113
  Cottage, 180, 183
  Cottage and Village Industry, 98, 99, 183
  Distilleries & Breweries, 83
  Engineering, 74, 79, 93, 182
  Fisheries, 51
  Ferro-chrome, 91
  Ferro-Manganese, 89
  Ferro-Silicon, 91
  Fertilizers, 94
  Food Processing, 83
  Forest-based, 37, 40, 74, 84, 112, 181
  Glass, 92
  Iron & Steel, 79, 121
  Large Scale, 26, 81, 82, 182
  Livestock-based, 84, 101
  Location of, 95
  Metal-based, 92, 112, 181
  Metallurgical, 112
  Mineral-based, 87, 112, 181, 182, 185
  Oil Crushing, 83
  Paper, 37
  Programme, 73, 180
  Proposed small scale, 104
  Refractories & Ceramics, 91
  Small scale, 112, 183
  Small Scale & Cottage, 98
  Small Scale factory, 100, 183
  Sugar, 23, 83
  Sulphuric Acid, 94
  Textile, 82, 182
Industrial backwardness, 73
  Consultant's Organization, 81
Investment Trust, 80, 81, 181
Infra-structure
  Development of, 9
Installed capacity, 80, 106, 184
Investment, 8, 9, 18, 26, 33, 42, 50, 68, 78, 105, 114, 117, 129, 149, 165, 177, 179, 182, 186, 190
Investment Programme, size of, 165
Irrigation, 4, 8, 12, 16, 17, 22, 23, 132, 175
  Potential, 17, 18
Italy, 62

J

Jammu & Kashmir, 150, 188
Japan, 53, 59, 62, 91

K

Kerala, 10, 34, 43, 50, 176
Kharagpur, 44, 48

L

Labour, 102
  Force, 132
Land
  Cultivated, 4
  Fallow, 15
Livestock, 29

M

Machkund, 106, 107, 109, 110
Madhya Pradesh, 34, 52, 53, 55, 63, 125, 151
Madras, 10, 11, 24, 32, 50, 56, 60, 61, 92, 125, 151, 176
Maharashtra, 83
Malaria, 3
Manpower, 3, 131, 171, 186, 191
Manures, 11, 12, 19, 20
Market, 24
  Loan, 159
Marketing, 24, 31, 48
Mechanization of mines, 69
Milk
  average yield, 28
  Colony, 31
  Marketable surplus of, 31
  Project, 31

MINISTRY OF CULTURE · GOVERNMENT OF INDIA
CSL

  Unions, 31
Minerals, 1, 7, 8, 9, 52, 179, 182
  Bauxite, 57, 60, 65, 67
  Chinaclay, 57, 60, 64, 75
  Chromite, 1, 7, 56, 59, 63, 67, 75, 91
  Coal, 1, 7, 9, 56, 59, 62, 66, 110
  Deposits and occurrences of, 55
  Dolomite, 1, 56, 60, 63, 75
  Fire Clay, 57, 60, 64, 91
  Graphite, 1, 57
  Iron ore, 1, 7, 53, 55, 58, 62, 66
  Kyanite, 61, 64
  Limestone, 1, 7, 56, 59, 63, 67
  Manganese, 1, 7, 53, 55, 58, 62, 63, 66
  Others, 57, 60, 64, 67
  Quartzite, 67
  Vanadium, 65
Mining, 26, 169, 175
Mining Leases, 70
Mobile Health Unit, 146
Mysore, 50, 56, 59

N

National Forest Policy, 34
Nationalization, 129
National Income, 151
National Metallurgical Laboratory, 65
National Small Industries Corporation, 101
NCAER, 42, 47, 88, 89, 112, 113, 136, 167
Netherlands, 62
Net output, 4, 8, 81, 100, 121, 176
  per worker, 4, 68, 133, 175, 183, 186
Nitrogen, 12, 19, 23
North Eastern Plateau, 55
Northern Plateau, 1, 2, 12, 15, 16, 21, 178
Norway, 62

O

Occupational Structure, 173
Orissa Mining Corporation, 161
Orgaine, 20
Output, 26, 33
Overgrazing, 29
Overheads
  Social and Economic, 79
Overhead requirements, 48

P

Pastures, 15
Pattern
  Cropping, 16
  Current crop, 16
  Occupational, 132
  of consumption, 107
  of development, 181
Peneplain, 12, 15
Per Capita, 4, 8, 11, 51, 82, 120, 141, 167
Personnel, 148, 145
  Technical, 134
Phasing, 78, 105
Phasing of generating capacity, 114
Phosphates, 30
Phosphatic, 19
Physiography, 17
Pilot project, 103
Plan
  First, 30, 52, 61, 62, 80, 99, 106, 108, 122, 142, 186
  Fourth, 66, 77, 78, 87, 89, 92, 105, 113, 114, 145, 148, 149, 163, 179
  Second, 142, 145, 150, 185
  Third, 25, 31, 32, 45, 66, 69, 77, 78, 92, 99, 105, 110, 114, 116, 125, 126, 130, 145, 149, 163, 168, 179, 181, 185
Planning Commission, 26, 99
Podu cultivators, 40
Population, 2, 11, 26, 43
  Agricultural, 4
  Composition of, 2
  density, 2
  growth, 3
  rural, 10
  Tribal, 21
  Urban, 3
Port
  Development, 129
  Paradip, 126, 129
Potash, 12
Poultry
  development, 32
  Rhode Island Red, 32
  White leghorn, 32
Power, 9, 18, 106, 184
  Generation of, 106, 107
  Requirement, 110
Productivity, 4, 7, 8, 10, 11, 26, 27, 70, 73, 133, 134, 141, 173, 175
Protein, 23
Punjab, 23, 92, 102

R

Railways, 44, 118, 121
Rainfall, 1, 11, 12, 16, 17, 53
Rajasthan, 60
Rate
  birth, 3, 136
  death, 3, 136
  mortality, 3, 138
Raw material, 102
Reclamation, 15, 16

Regional
  distribution, 35
  Variation, 138
Reserve Bank of India, 150
Revenue
  Non-Tan, 160, 161
  Per capita, 188
  Relative increases in, 152
  Trends in, 151
Rivers
  Brahmani, 121
  Baitarni, 121
  Mahanadi, 118
Road, 7, 9, 24, 39, 40, 118, 121, 125
Roughages, 28
Rourkela, 8, 42, 66
  Steel Plant, 78, 81, 88, 107, 121, 122, 166
Royalty, 71

S

Sanitation, 142
Saurashtra, 61
Scientific Research and Intelligence, 70
Seeds, 26
  improved, 20, 27
Setting, 175
Size, 3
Small Scale Industry
  Location of, 105
Soil, 12, 15, 16, 19, 20, 23, 176
  Conservation, 21
  erosion, 21, 29, 176
Small Saving, 159
State Development Wing, 80
State Income, 28, 43, 52, 162, 163, 191
State's Mining Geological Department, 68
Survey, 18, 37
  National Sample, 4, 11, 131
  Poorman's Diet, 142
  Statewise Nutritional Sample, 30
Sweden, 62, 91

T

Tanks, 16, 17
Tata Iron and Steel Works, 62
Tatanagar, 44, 48
Tax
  Agricultural Income Tax, 155
  Entertainment, 152, 155
  General Sales Tax, 152, 155, 188, 189
  Land Revenue, 152, 155
  Motor Spirit, 152, 155
  Motor Vehicle, 152, 155
  Others, 155
  State Excise, 155
Taxation, 155
Taxation Enquiry Commission, 157, 189
Techniques of, 9, 19, 101
  Cultivation, 18
  Working, 41
Temperature, 11
Thana Demonstration Farms, 19
Topography, 12, 15, 16, 176
Towns, 3, 24
Training
  facilities for, 135
  technical, 4, 9, 72
Trade and Commerce, 27
Transport, 4, 7, 9, 24, 27, 31, 118, 121, 130, 166, 185
  facilities, 69
Trend
  Industrial development, 74
Tribal, 2, 133
Tube-wells, 18

U

U.K., 52, 59, 62, 64
U.P., 23, 83
U.N.I.C.E.F., 149
Under-employment, 3, 33
Unemployment, 3
U.S.A., 59, 62, 63, 64, 91
Utilization of, 61
  Land, 15
  road facilities, 129
  Wood, 35

V

Veterinary facilities, 28, 30

W

Warehousing, 24
Water supply and Drainage, 146
Waterways, 118
  Inland, 121
Wells, 16, 17, 18
West Bengal, 10, 11, 24, 44, 53, 61, 62, 63, 64, 113, 118, 131, 176
West Germany, 62
W.H.O., 149
Working Force, 3, 9, 11, 26, 34, 43, 100, 132, 133, 175, 176
Working Plan, 38

CENTRAL SECRETARIAT LIBRARY
62-6378
13 SEP 1962
OF INDIA

AS-021105

CSL-AS-54 (R)
AS021105
309.1544 TEC